Appendix B. Cultural Resource Documentation

Preserving America's Heritage

March 6, 2007

Ms. Connie L. Rupp
Area Manager
Bureau of Reclamation
Albuquerque Area Office
555 Broadway Boulevard NE, Suite 100
Albuquerque, NM 87102-2352

Ref: Proposed Seven Rivers Water Pipeline Project
Eddy County, New Mexico

Dear Ms. Rupp:

We are in receipt of your notification dated February 9, 2007, and supporting documentation indicating that the referenced undertaking will adversely affect properties eligible for listing in the National Register of Historic places. Based upon the information you provided, we have concluded that Appendix A, *Criteria for Council Involvement in Reviewing Individual Section 106 Cases,* of our regulations, "Protection of Historic Properties" (36 CFR Part 800) does not apply to this undertaking. It is our understanding, based on conversations with your office and the New Mexico State Historic Preservation Officer (SHPO), that the potential adverse effects from this undertaking can be resolved successfully without ACHP involvement. However, should circumstances change and you determine that our participation is required, please notify us.

Pursuant to 36 CFR 800.6(b)(1)(iv), you will need to file the final executed Memorandum of Agreement, developed in consultation with the New Mexico SHPO and other consulting parties, and related documentation with us at the conclusion of the consultation process.

Thank you for providing us with the opportunity to review this undertaking. If you have any questions or require further assistance of the ACHP, please contact me at 202-606-8582, or e-mail me at nbrown@achp.gov.

Sincerely,

Nancy J. Brown

Nancy J. Brown
Historic Preservation Specialist
Federal Property Management Section
Office of Federal Agency Programs

Ysleta del Sur Pueblo

Tribal Council

EST. 1682

TIGUA INDIANS • YSLETA DEL SUR PUEBLO

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ORIGINAL

March 7, 2007

Ms. Connie L. Rupp, Area Manager
United States Department of Interior
Bureau of Reclamation
Albuquerque Area Office
555 Broadway Blvd. NE, Suite 100
Albuquerque, NM 87102-2352

Dear Ms. Rupp:

This is in response to your correspondence received in our office on February 14, 2007 in which you provide Ysleta del Sur Pueblo the opportunity to comment on the Seven Rivers Pipeline Project.

While we believe that this project will not adversely affect traditional, religious or culturally significant sites of our Pueblo and have no opposition to it, we would like to request consultation should any discovery made during this project be determined to fall under NAGPRA guidelines. Copies of our Pueblo's Cultural Affiliation Position Paper and Consultation Policy are available upon request.

Thank you for allowing us the opportunity to comment on this project.

Sincerely,

Arturo Senclair
Tribal Governor

AS:svg

DRAFT DATA RECOVERY PLAN

Introduction

The proposed data recovery plan is to conduct limited excavations at LA-154410 on the Seven Rivers Pipeline Project. LA-154410 is a newly recorded archaeological site. It was recorded by Marron and Associates, Inc. on September 8, 2006. Marron recorded the site during a Class III cultural resource survey for the New Mexico Interstate Stream Commission. The Seven River Pipeline Project is a 42-inch waterline that runs though Bureau of Reclamation, State and private land. The area of potential effect or the construction easement is 30m wide along the pipeline alignment. The depth that the pipeline will be buried will vary from 3 feet to 18 feet. LA-154410 is a prehistoric site that the alignment will run though (See map for LA-145510). As the pipeline passes though the site, it will impact two features (F.1 and F.2). To mitigate this impact Reclamation has developed a data recovery plan for LA-154410.

Reclamation also recommends that all sites identified in Marron and Associates cultural resource report, except LA-112630, LA-154405, LA-146114, LA-139063, LA-155596, LA-155597 and LA-83766, are monitored during construction and all historic structures within the APE should be avoided. Monitoring on LA-146114 should take care to avoid Area 2 and monitoring on LA-154409 should help to avoid all features on this site. Monitoring of LA-146115 should be done to ensure avoidance of Area 1. If they can not be avoided, then a mitigation plan for these sites will be necessary. If this is the case, all work on these sites will stop until mitigation plans are finished and applied. If artifacts are encounter during monitoring, they will be given a point province, bag and label. All artifact recovered from this project will be given to Reclamation. LA-154402, LA-154403, LA-154406, LA-154409 all have acequias on them. Reclamation recommends that all of these acequias be avoid. These acequias are consider active by the area residents and are more than 50 years old. Six historic building were identified during this survey. Building 1 though 5 may be eligible under Criterion A; they could be considered a historic district. Because of this, Reclamation recommends that Building 1 though 5 are eligible for consideration for the National Register. Building 6 is not recommended for listing on the National Register because it is no longer in context and has been modified. All of these historic structures should be avoided. Reclamation recommends that all sites identified in Marron and Associates cultural resource report and Addendum A except LA-139063, LA-155596, LA-155597 and LA-146113, are eligible for listing in the National Register. The New Mexico Interstate Stream Commission will have their contractor provide additional archival research on all sites that are of an undetermined eligibility to mitigate potential effects.

Environmental Setting

Overview: The majority of the following sections were taken from Salo, Lintz and Gibbs "Prehistoric Properties in the McMillan-Avalon Segment of the Middle Pecos River: National Register of Historic Places Multiple Property Documentation Form and Corresponding Nominations." The southwestern deserts of North America rank among the most diverse ecosystems in the world, a condition that provides some offset to the general lack of abundance of resources for the inhabitants of a marginal environment. Southeastern New Mexico is an arid to semi-arid region in the northern reaches of the Chihuahuan Desert. Water is scarce in the Desert Southwest, and access to this resource has long been the driving force shaping the interrelationships among plants, animals, and human lifeways. Although shifting climatic conditions have altered past environments, the region has generally remained warm and dry throughout its period of human occupation. Opportunistic decisions prompted by ever-changing conditions and priorities link people to their environment and contribute to cultural variability. The dry lands of the northern Chihuahuan Desert contain sparse, but diverse, plant and animal life within a setting of sharp ecological contrasts.

Physiographic and Topographic Setting: In southeastern New Mexico, there are three, interconnected, major physiographic features: the Pecos Valley, the Llano Estacado (Staked Plains), and the Sacramento Slope. The Pecos Valley is bordered on the east by the Llano Estacado, a part of the High Plains section of the Great Plains province. The Sacramento Slope lies west of the Pecos Valley.

All of the study area lies within the Pecos Valley. The Pecos River and the associated landforms and terraces form a broad north-south corridor through southeastern New Mexico. The river starts in the Sangre de Cristo Mountains where it flows south and eastward for approximately 900 miles. It enters the Rio Grande near Langtry, Texas. Today the Pecos River is a tamed watercourse with multiple dams controlling its flow (Sheridan 1975).

Permian bedrock underlies most of the Pecos Valley. Its chief constituents are dolomite, limestone, sandstone, shale, and gypsiferous and saline evaporatives (Hawley 1986). Dissolution of these bedrock units is a constant process and may have begun in the Jurassic period. Numerous dissolutions and sinking depressions, including the valley occupied by the Pecos River and the Carlsbad Caverns, developed in these Permian units. At least three massive collapses under the lower Pecos Valley north of Carlsbad occurred during the Quaternary period. This allowed the ancestral lower Pecos River to cut downward and capture the headwaters of east-flowing streams crossing the plains (Hawley et al. 1976).

Modern day land use in Eddy County consists of cattle ranching, irrigated crops, oil production, potash, and salt mining. The principal irrigated crops are cotton, alfalfa, sorghum, and grains. Most of the oil-bearing areas are east of the Pecos River, around Artesia, Hobbs, and Carlsbad. The potash and salt-bearing areas are located in the east-central part of the area (Chugg et al. 1971).

Climate: As noted above, the study area lies within the Chihuahuan biotic province (Brown 1994; Dice 1943). The climate of this area is typical of other arid regions of the American Southwest and northern portions of Mexico. The climate of southeastern New Mexico is semiarid and continental, having moderated winters and hot summer days followed by cool nights. From 1961-1990, the average precipitation per year in the study area was 13.32 inches. Most of the delivery comes during June through September, with the months of August and September being when most of the rain falls in this part of New Mexico because dominant southwesterly winds bring moisture from the Gulf of California. Most of the rainfall is delivered through heavy thunderstorms (Chugg et al. 1971). The lowest annual precipitation recorded was 2.16 inches at Lake Avalon just south of the study area in 1917 (Chugg et al. 1971). Average regional snowfall ranges from 1 to 8 inches. As much as 40 inches, however, has fallen in one year at the towns of Hope and Artesia (north of the study area).

Soils: Seven soil associations are found in the Eddy County area. These are

1. Limestone rock land-Ector association (rock land and very shallow, stony and rocky, loamy soils over limestone; on hills and mountains),
2. Reagan-Upton association, (loamy, deep soils and soils that are shallow to caliche; from old alluvium),
3. Reeves-Gypsum land-cottonwood association (loamy soils that are very shallow to moderately deep over gypsum beds, and gypsum land),
4. Kimbrough-Stegall association (loamy soils that are very shallow to moderately deep to caliche; from old alluvium),
5. Kermit-Berino association (sandy deep soils from wind-worked mixed sand deposits)**,**
6. Simona-pajarito association (sandy, deep soils and soils that are shallow to caliche; from wind-worked deposits), and
7. Arno-Harkey-Anthony association (loamy, deep soils from recent mixed alluvium) (Chugg et al. 1971).

The study area lies primarily within the Arno-Harkey-Anthony association. This association consists of deep, nearly level soils on flood plains of the Pecos River. Elevation at this association ranges from 3,000 to 4,200 feet. The major soils of this association developed in calcareous alluvium of mixed origin. The degree of salinity of the soils and the depth of the water table are variable (Chugg et al. 1971).

Arnos soils are deep, light colored, and saline. The water table is usually below a depth of six feet throughout the year, but in areas near the backwaters of Lake McMillan, the water table fluctuates with the rise of the water in the lake. Harkey soils are deep, well drained, and moderately dark colored, and they occur primarily in low terraces. These soils are generally moderate to strongly saline. Anthony soils are deep, well-drained, and light colored that occur on low terraces, and are easily eroded by wind and water. These soils occur in low terraces along the Pecos River, generally south of Lake McMillan. Because of their physical characteristics, Anthony soils are used for irrigated crops, native pasture, and wildlife habitat (Chugg et al. 1971).

Biotic Province

Southeastern New Mexico is an extension of the Chihuahuan Biotic Province and is characterized as arid with vegetation that is characteristic of southwestern mountains and deserts (desert scrub). Fauna predominantly includes rodents (squirrels, pocket mice, rats and mice) and bats, numerous species of lizards, snakes and amphibians (toads, spadefoot toads) plus a variety of waterfowl and birds (Blair 1950; Dice 1943). Specific environmental details are enumerated below.

Vegetation: The study area lies within three vegetation communities: Creosote Desert scrub, mixed scrub (yucca, mesquite, creosote bush), and Mesquite grasslands. Creosote Desert scrub, which dominates most of the vegetation communities in the Chihuahuan desert of New Mexico, is the dominant vegetation community found in the study area. Plants present within the study area include tarbush (*Flourensia cernua*), ocotillo (*Fouquieria splendens*), creosotebush (*Larrea tridentata*), black grama (*Bouteluoa eriopoda*), fluffgrass (*Erioneuron pulchellum*), Alkali sacaton (*Sporobolus airoides*), sand dropseed (*Sporobolus cryptandrus*), broom snakeweed (*Gutierriza sarothrae*), honey mesquite (*Prosopis glandulosa*), saltcedar (*Tamarix ssp)*, whitethorn acacia (*Acacia constricta*), pricklypear cactus (*Opuntia ssp*), and soaptree yucca (*Yucca elata*).

Wildlife: The Chihuahuan Desert of south-central New Mexico contains a diversity of physical environments for wildlife. Physiographic features such as scarps, plateaus, plains, mountains, and drainage systems also influence wildlife distribution. The most common faunal species in the study area are Pronghorn (*Antilocapra americana*), Desert cottontail (*Sylvilagus audubonii*), black-tailed jackrabbit (*Lepus californicus*), coyote (*Canis latrans*), great blue heron (*Adren herodias*), snowy egret, black tern (*Chlidonias niger*), mallard (*Anas platyrhynchos*), American coot (*Fullica americana*), turkey vulture (*Cathartes aura*), red-tailed hawk (*Buteo jamaisensis*), osprey (*Pandion haliaetus)*, American kestrel (*Falco sparverius*), scaled quail (*Callipepla aquamata*), mourning dove (*Zenaida macroura*), western meadowlark (*Sturnella negleta*), barn swallow (*Hirundo ruatica*), cactus wren (*Campylorhyncus brunneicapillus*), northern mockingbird (*Mimus polyglottos*), loggerhead shrike (*Lanius ludovicianus*), greater roadrunner (*Geococcyx californicus*) curved-bill thrasher, (*Toxsostome curvirotre*), chipping sparrow (*Spizella passerina*), and the yellow-rumped warbler (*Dendroica coronuta*). Historically Buffalo (*Bison Bison*) roomed this area.

Aquatic: Numbers of fish species present in a particular basin depend more on geology, climatic and evolutionary history, and size and complexity of the watershed than on elevation or terrestrial vegetation (Brown 1994). The Pecos River contains a diversity of aquatic organisms. Forty-six species, distributed within 13 families, have been reported from the Pecos River. The most common species in the Pecos River are minnows and carps (Brown 1994). This is not surprising since the majority of native fishes that occur in the Southwest consist of the minnow and sucker families (Brown 1994).

Molluscs: Several fossil mollusc locations have been sampled throughout southwestern New Mexico from the Texas State line to the headwaters of the Pecos River. The sampled locales represent a range of environments, including terrace and lacustrine deposits, cave deposits and archaeological sites (see Leonard and Frye 1975; Metcalf 1974; Murray 1985). Habitat conditions for some kinds of molluscs (e.g., soft mud and muddy conditions) are still present today within the study area, but with closure of Lake Brantley, some riffles have disappeared. In general, the number of molluscan species has declined throughout the Chihuahuan desert. Part of the reason for this decline is the loss of habitat for the terrestrial species (Metcalf 1974). The loss of aquatic species may also be due to contamination by herbicides or insecticides and the introduction of non-indigenous bivalve species (Leonard et al. 1975).

The northern and southern portions of the region exhibit notable geographic differences in the distribution of molluscan fauna. The northern sampling localities (in De Baca, Curry, Roosevelt, and Chaves counties) had more molluscs and represented more species than the sampling localities in the southern areas (Eddy and Lea counties) (Katz and Katz 1994). Shell assemblages found near the current study area include *Heliodiscus eigemnanni, Ausscinea sp, Gryaulus parvus, Pirene mercatoria, Gastropoda pellucida, Amblema sp., Lampsilis sp., and Ligumis sp.* The molluscan collection from archaeological sites along the Pecos River in Eddy County is presented in Table 1. This collection contains eight families, of which three families are pelecypods, two families are aquatic pulmonate snails, and three families are terrestrial snails.

Paleoenvironment: Although the Southwest has generally remained dry throughout the Holocene, paleoenvironmental studies show that climatic fluctuations of the past notably altered the environment at different times. Subsequent changes in the distribution of key floral and faunal resources would have impacted prehistoric economies and land use strategies. Paleoenvironmental research in the Southwest is largely limited to primary areas of archaeological interest, and therefore little has occurred in southern New Mexico. Still, much of the previous work broadly applies to the region as a whole. Among the data used for paleoenvironmental research, packrat midden and dendroclimatological studies in particular have provided important insights.

Table 1
Molluscan Fauna from Archaeological Sites along the Pecos River in Eddy County, New Mexico

Family	*Scientific name*
Pecelypods (bivalves)	
Unionidae (Fresh water mussels)	*Cyrtonaias tampiconensis*
	Popenaias popei
	Lampsilis teres
	L. sp.
Sphaeriidae (Fingernail clams)	*Sphaeirum sp.*
Corbiculidae (Asiatic clams)—recently introduced	*Corbicula fluminea*
Aquatic pulmonates (snails)	
Planorbidae	*Helisoma trivolvis*
Physidae	*Physa sp.*
Terrestrial Snails	
Polygiridae	*Polygra texasiana*
Succineidae	*Succinea grosvenori*
	S. avara
	S. luteola
Spiraxidae	*Euglandina sp.*

Source: Katz and Katz (1985)

Shortly after the end of the Pleistocene, mesic forests prevailed in the Southwest, but the vegetation soon shifted toward the drier, scrubbier deserts of the present. The geologic-climatic work of Antevs (1948) laid the initial framework for climatic reconstruction in North America, particularly in the western United States. Although these results are dated, Antev's model provides a base-line reference point for the more recent environmental studies of the region. Antevs (1948, 1955) divided the post-glacial times of the last 10,150 years, or the "Neothermal," into three different periods: the Anathermal, Altithermal, and Medithermal. The Anathermal represents the period from 10,150 to 7,500 years ago, within which cool and wet conditions diminished as a result of increasing aridity. The Altithermal extends from 7,500 to 4,500 years ago and is associated with an arid period. Also known as the "Long Drought," the Altithermal is the most controversial of Antevs' climatic periods as more research that is recent (discussed below) indicates that extremely dry summer conditions were not as widespread as first thought. The Medithermal represents the last 4,500 years and is characterized by variable climatic conditions of intermittent droughts and wet periods.

Better methods of paleoclimatic reconstruction using data such as macrobotanical remains, pollen, and tree-rings provide increasingly detailed accounts of past environments. Packrat middens are important sources of macrobotanical remains, and midden studies provide better resolution to broad climatic trends. Packrat middens, composed of vegetation within a 100-m area of the nests, are also good calibrators of palynological studies, which rely on samples that can be biased by airborne pollen from many miles away and from different elevational zones. Most notably, Van Devender and Spaulding's (1979) packrat midden study of the Southwest details Holocene climate and vegetation. Large-scale vegetation changes occurred rapidly around 11,000 years ago with the abrupt replacement of Pleistocene piñon-juniper forests by juniper and juniper-oak/oak-juniper woodlands and grasslands. Desert scrub vegetation grew at roughly 1,200 m amsl below its current elevation, maintaining only a patchy distribution in low desert areas, and not extending into the high desert of the northern Chihuahuan Desert. The 11,000-year mark is considered by Van Devender and Spaulding (1979) to represent the start of the vegetative Holocene.

Woodlands gradually retreated to higher elevations through the early Holocene, with the xeric oak-juniper woodlands of the northern Chihuahuan Desert disappearing by 8,400 to 8,100 years ago (Van Devender et al. 1987:332). Van Devender and Spaulding (1979) originally considered the onset of the middle Holocene to be 8,000 years ago. More recently, Van Devender et al. (1987:345) state that this date may be late based on new data showing that desert scrub and grassland communities were displacing the woodlands of 1,250 and 1,500 m between roughly 9,000 to 8,000 years ago across much of the Southwest. The desert scrub communities of the middle Holocene approximated modern composition in most areas. Middle Holocene packrat middens frequently contain creosote, with ocotillo, a plant absent from late Wisconsinan and early Holocene middens, emerging as a common desert shrub up to 1,350 m in elevation. The northern Chihuahuan Desert of the middle Holocene, however, was not typical of the greater Southwest, consisting of high desert grasslands. Another major shift in Southwest vegetation occurred at the beginning of the late Holocene just over 4,000 years ago, as most desert scrub communities became essentially modern with an increased abundance of plants such as ocotillo, sotol, mesquite, and lechuguilla. The range of creosote expanded substantially from the middle to late Holocene. The northern Chihuahuan Desert was the last Southwestern region to complete the transition to current conditions. Modern grassy desert scrub conditions in southern New Mexico and west Texas replaced the grasslands of the middle Holocene between 1,500 to 2,000 years ago, which covered much of the terrain between 1,200 to 2,000 m. Creosote, lechuguilla, mariola, and white thorn are notable plants that encroached on the grassland communities from patchy distributions in microhabitats.

Packrat midden studies reveal Southwestern biogeography, and by extension, the climatic trends that influenced plant distributions. The loss of piñon and other mesic species from middle elevation woodlands occurred around 11,000 years ago, but a more modern structure of both vegetation and climate did not appear until about 8,000 years ago with the beginning of the middle Holocene. At this time the modern precipitation pattern of monsoonal summers and drier winters was increasing, while the more seasonally uniform precipitation of the late Wisconsinan-early Holocene came to an end. These climatic patterns are indicative of shifts in winter and summer storm tracks across North America, which themselves result from interaction between changes in ocean and continental temperature. The specifics of these interactions are not yet fully understood by researchers. It does appear, however, that as oceans warmed following the North American glacial retreat, Pacific-generated frontal systems lost the strength that previously pushed them across the Southwest as far as the Texas Trans-Pecos. Simultaneously, the larger and warmer Gulf of Mexico and Gulf of California more effectively channeled tropical moisture into the Southwest during the summer. As these precipitation patterns shifted through the middle and late Holocene, desert scrub conditions expanded. Middle Holocene climate does not appear to have been as dry as inferred by Antevs' (1948) Altithermal, and Van Devender and Spaulding (1979:709) dismiss the notion of a "Long Drought" in the Chihuahuan Desert. The establishment of monsoonal summers ensured relatively wet summers compared to those of the Great Basin and Mohave deserts, which are more indicative of the Altithermal. The shift to modern vegetation at the beginning of the late Holocene just over 4,000 years ago (Van Devender and Spaulding 1979; Van Devender et al. 1987) roughly correlates with the onset of Antevs' Medithermal. Late

Holocene climate will be discussed further below. As mentioned above, the shift from grassland to more desert scrub in the northern Chihuahuan Desert was the last of the major vegetation changes in the Southwest. The relatively high elevation, susceptibility to severe winter freezes, and the erosion of well-developed soils in the middle and late Holocene in this region make it uniquely suited for such a biome (Van Devender and Spaulding 1979:709; Van Devender et al. 1987:348).

Holocene vegetation changes also had important impacts on animal life. Juniper and juniper-oak woodlands and tall grass prairies were present, but dwindling and ultimately disappeared in the Southwest by 8,000 years ago, until these conditions supported more diverse populations of large herbivores. Mammoth (*Mammuthus* sp.) lived shortly into the Holocene, and bison (*Bison* spp.) populations became expansive alongside the grasslands. The retreat of grasslands and woodlands into the higher elevations was pronounced by 8,000 years ago. Large mammals of these times, such as pronghorn antelope, mule deer, and bighorn sheep, became more restricted in their range, retreating with these environs up mountain slopes, while small mammals such as jackrabbit, cottontail rabbit, and small rodents flourished in the basins. Changes in the focus of human subsistence efforts from big game to small game and an expanded plant food base are closely related to these environmental shifts.

Packrat midden studies show large-scale climatic trends in the Southwest that are useful for archaeologists, but more detailed understanding regarding the timing and duration of climatic events is required to support many hypotheses about cultural ecological relationships. Dendroclimatological research by Grissino-Mayer et al. (1997) on a network of tree-ring and archaeological sites in southern New Mexico provides detailed information for the past 1,373 years. Grissino-Mayer et al. (1997) gauge rainfall amounts by year for the past 1,373 years and hypothesize about the implications of periods of abundant rainfall and drought on prehistoric, especially Mogollon, cultures in the Southwest. Tree-ring data were collected at locations in the Organ, San Mateo, and Magdalena Mountains, in addition to data from 12 archaeological sites in the Sierra Mimbres and Sacramento-Sierra Blanca-Capitan Mountains of south-central and southwestern New Mexico. Grissino-Mayer et al. (1997:56-61) recognize three climatic episodes in particular that they find coincident with prehistoric cultural changes in southwestern New Mexico. These episodes of precipitation scarcity and plentitude are as noteworthy for their seasonal variance as for their divergent totals since the seasonal timing of precipitation impacts the local resource structure.

Generally, dry conditions prevailed from 1,250 to 1,000 years ago, with a severe, century-long drought occurring between 1,055 and 955 years ago. This may lend support to archaeological research, which indicates that environmental stress at the time of this drought prompted greater regional interaction with neighboring groups. Favorable conditions of greater, less seasonally variable rainfall following this drought between 955 and 785 years ago appear to correspond with an efflorescence of Mogollon population and culture. Increased population density, more intensive farming, and shifts to Mimbres pottery and above-ground living structures are key changes of Classic Mimbres times between 1,000 and 850 years ago. The onset of these advances appears to conflict with the timing of the drought to some extent, but Grissino-Mayer et al. (1997) note that, although dry, rainfall amounts were increasing from roughly 1,000 years ago. Within the wet period, however, an extreme 16-year drought (A.D. 1080 – 1095/870 - 855 years ago) occurred with low, and highly variable, rainfall. Population movement toward regional centers, particularly Casas Grandes, Mexico, corresponded with the 16-year drought and continued to roughly 700 years ago, when another drought, called the “Great Drought” (A.D. 1227 – 1251/723 – 699 years ago) because of its severity, occurred coincidentally with the collapse of Casas Grandes and the beginning of population migration and aggregation into outlying areas.

From 700 years ago to the present, cooler and wetter conditions were typical, although periodic decadal-length droughts occurred. A large portion of this period (ca. A.D. 1350 – 1750/600 – 200 years ago) is labeled the “Little Ice Age” by some researchers. No close correlation between these seemingly favorable conditions and cultural shifts stand out as population aggregation continued, followed by European encroachment. This contrasts with the increased population density and techno-stylistic ceramic changes concurrent with the previous wet period of 100 to 200 years earlier. Grissino-Mayer et al. (1997:62; also see Grissino-Mayer 1995) hypothesize that the lack of a similar response to favorable conditions is related to dissimilarity in rainfall variability despite similar annual precipitation totals. While the previous wet period exhibited a stable climate with reliable summer monsoonal rainy seasons, past fire scars on trees indicate that Little Ice Age precipitation was more evenly distributed across the year. Moreover, it is possible that tree-ring widths from this time period are exaggerated as a result of lessened evapotranspiration in a cooler environment rather than actual precipitation. In short, the paleoclimatic record of the Little Ice Age is poorly understood and provides a tenuous basis on which to infer cultural-climatic relationships.

The archaeology of the Pecos River and of southeastern New Mexico is not necessarily tied to the environment in the ways Grissino-Mayer et al. (1997) suggest. There is no one-to-one relationship between environmental and cultural change, and the role of archaeological study is to consider what constitutes a drought or a wet period relative to the cultural buffering mechanisms in place at any given time. Still, south-central and southwestern New Mexico are neighboring areas, and the findings of Grissino-Mayer et al. (1997) provide good starting points for understanding how the archaeology of southeastern New Mexico may address regional issues related to prehistoric interaction and land use

Cultural-Historical Overview

Humans have visited and lived in southeastern New Mexico for over 10,000 years. The following is a brief culture history of the area. The cultural periods used in the overview are presented in Table 2. This sequence includes information derived from the general region, as well as specific information on Archaic periods from Brantley Reservoir (Katz and Katz 1994), and from the ceramic phases based on the eastern extension of the Jornada Mogollon (Sebastian and Larralde 1989).

Table 2
Cultural Periods and Associated Dates for Southeastern New Mexico

Cultural Period		Associated Dates
Paleo-Indian		ca. 10,000 – 5500 B.C.
Clovis		ca. 10,000 – 9000 B.C.
Folsom		9000 – 8200 B.C.
Late Paleo-Indian		8200 – 5500 B.C.
Archaic		5500 B.C. – A.D. 600/900
Early Archaic	(Archaic I)	5200 – 3200 B.C.
Middle Archaic		3200 – 1000 B.C.
	(Archaic 2)	1700 – 1000 B.C.
Late Archaic		1000 B.C. – A.D. 600/900
McMillan Phase	(Archaic 3)	1000 B.C. – A.D. 1
Transitional	(Archaic 4)	A.D. 1 - 500
Ceramic		A.D. 600/900 – 1540
Querecho		A.D. 600/900 - 1150
Maljamar		A.D. 1150 – 1300
Ochoa		A.D. 1350 – 1450
Athabaskan		A.D. 1450 – 1540
Protohistoric		A.D. 1540 – 1650
Historic		A.D. 1650 – present

Paleo-Indian Period (ca. 10,000 – 5500 B.C. / 12,000 – 7,500 years ago)

The Paleo-Indian period represents the earliest known occupation in the area. People during this period relied on mega fauna (predominantly mammoth and *Bison antiquus*) as well as broader-based hunting-and-gathering for their subsistence needs. The Paleo-Indian period is divided into three subperiods marked by different technological complexes. The earliest of these is the Clovis, dating between circa 10,000 and 9000 B.C. This is followed by the Folsom (9000-8200 B.C.), and finally, the Late Paleo-Indian complexes (8200-5500 B.C.).

Paleo-Indian artifacts included distinctive lanceolate projectile points, side scrapers, end scrapers, gravers, modified flake tools, and drills. These tools are sometimes found associated with the remains of extinct mega fauna species. Typically, Paleo-Indian sites are located near playa lakes and relict streambeds or along small rises and ridges. These sites are usually ephemeral, however, and may be difficult to recognize. Differences in topographic settings and artifact and faunal assemblages have led archaeologists to interpret Paleo-Indian sites in terms of function classes, based on the activities inferred to have taken place there. Typical site types of this period include campsites, kill sites, processing sites, and quarry sites (Irwin-Williams 1979).

During the Paleo-Indian period, the climate was vastly different than it is today. It has been marked by continuous environmental change over several thousand years. During the earlier phases, the environment was wetter and cooler. Throughout the course of the Paleo-Indian period, the climate became increasingly arid with greater seasonal variation. These conditions resulted in shifting vegetation patterns and faunal extinctions, which, in turn, affected Paleo-Indian subsistence strategies, settlement patterns, and lithic technologies (Haynes 1975).

Clovis

The earliest Paleo-Indian presence in southeastern New Mexico is defined as the Clovis period. Sites associated with this period are identified by the Clovis point (a basally fluted, lanceolate projectile type), sometimes found in association with mammoth remains. Clovis sites are generally thought to consist of remains that are indicative of kill and butchering activities. These sites are believed to be most often located on landforms with high relief overlooking playas, streams, or marshes. Sites attributed to the Clovis period typically date between circa 10,000 and 9000 B.C. (Sebastian 1989a:24).

Folsom

Around 9000 B.C., the environment changed of southeastern New Mexico. There was a decrease in effective moisture. The Folsom period probably represents an adaptation to this changing environment by human groups. Groups associated with these adaptations are identified by the Folsom projectile point and other diagnostic tool forms. Although this point, like the earlier Clovis, is also a basally fluted, lanceolate form, Folsom points are smaller, have longer channels or flutes, and are parallel flaked, and the lateral grinding extends higher up the point’s margin. The few radiocarbon dates available for this period suggest that there is a second type of point, the Midland, which is roughly contemporaneous with Folsom points. The major difference between the two is that the Midland type is not fluted (Sebastian and Larralde 1989:31).

Current evidence suggests that hunting the extinct *Bison antiquus* was a primary subsistence activity during Folsom times, although it is likely that these groups also practiced extensive resource gathering. Sites characteristic of the Folsom period typically date between 9000 and 8200 B.C. (Sebastian and Larralde 1989).

Late Paleo-Indian Complexes

Projectile points associated with the Late Paleo-Indian complexes (8200 - 5500 B.C.) are characterized by a significant increase in morphological variability. The variability in point styles has formed the basis for the definition of a number of different complexes including Firstview, Plainview, Frederick, Agate Basin, Hell Gap, Alberta, and Cody.

Archaic Period (5500 B.C. – A.D. 600/900 / 7,500 – 1,000 years ago)

The Archaic period, lasting some 5,000 to 6,000 years, is ascribed more longevity than other prehistoric cultural period. Despite the fact that many sites in southeastern New Mexico have been assigned to the Archaic period, relatively little is known about this time period. Subsistence adaptations, during the Archaic period, are thought to have generally changed from a reliance on big game hunting to a more broad-based hunting and foraging strategy. Archaic period occupations are distinguished from earlier and later occupations by side- and corner-notched projectile points, bifaces, flake scrapers, and drills. These sites typically consist of lithic and fire-cracked rock scatters that are often situated in areas that overlook drainages.

Sites of this period are usually divided into three general temporal categories: Early, Middle, and Late. This is based on the morphological changes in projectile point types and a number of chronometric dates. In their overview of southeastern New Mexico, Katz and Katz (1994:106-107), however, identified four Archaic phases (some of which include local phase sequences): Archaic 1 through Archaic 4.

Early Archaic (5200 - 3200 B.C.; Archaic 1 of the Katz and Katz 1994:106 sequence) remains appear to be associated with a climatic shift from the relatively moist and cool late Pleistocene to the comparatively arid Altithermal. This transition is thought to have occurred throughout the course of the Early Archaic and appears to have significantly impacted faunal populations. As the Early Archaic progressed, however, increasingly drier conditions led to the extinction of most large faunal species. Johnson (1983) suggests that the shift to a more generalized hunting-and-gathering subsistence strategy, particularly systematic plant-use, was an adaptive response to nutritional stress created by these changing climatic conditions.

Sites of this temporal period may be differentiated from Paleo-Indian and later Archaic occupations by morphologically discrete projectile point types, including straight-stemmed, concave-based varieties (e.g., Bajada) or large, straight-based types (e.g., Jay). Although these projectile point types have not been associated with dated contexts in the region, they date from approximately 5500 B.C. to 3200 B.C. in the Colorado Plateau region (Irwin-Williams 1979). Katz and Katz (1994:106) report that Jay points have been recovered from the Pecos River in Eddy County.

The Middle Archaic, which dates from 3200 to 1000 B.C., has been characterized as a time of shifting subsistence strategies. During the Middle Archaic, there was a change from the manufacture of large, straight-stemmed projectile points, characteristic of the Early Archaic, to smaller or medium-sized, shouldered, and concave-based types (e.g., San Jose, Pedernales, Hanna). In their sequence, Katz and Katz (1994) do not have a phase for this time period.

The climate during the Late Archaic (1000 B.C. - A.D. 600/900) is thought to have been similar to modern conditions. Material culture associated with the Late Archaic includes grinding stones, bifacial tools, and scrapers, as well as baskets, cordage, and snares. The diverse artifact assemblages evident during this time suggest a broader-based subsistence strategy, with an increased emphasis on small game and wild plants. The Late Archaic is also characterized by a substantial increase in medium-sized, corner- and side-notched projectile point styles (e.g., Marcos, Williams, Shumla, and Ensor). These points resemble those associated with the Plains or Central Texas Archaic (Rodgers 1987).

The Katz and Katz's Archaic 2 phase, 1700-1000 B.C., has "no diagnostic projectile points" (Katz and Katz 1994:107). This phase is based on several dated isolated burned rock hearths. Archaic 3 (1000 B.C. - A.D. 1) was earlier defined as the McMillan phase (Katz and Katz 1985). This phase includes several diagnostic dart points. Using a typology developed by Leslie (1979), points associated with this phase include Darl, 8D, and 9. In their overview of the Carlsbad area, Katz and Katz (1994) also employ a fourth archaic division, the Terminal Archaic that they date to A.D. 1-500. Like the earlier phase, Leslie's (1979) point typology was used to distinguish diagnostic styles of the phase. These include 6C, 6D, 8A, San Pedro, and three varieties of the Pecos point.

Ceramic Period / Formative Period (A.D. 600/900 – 1540 / 1,300/1,050 – 410 years ago)

Beginning sometime between A.D. 600 and 900 and continuing to as late as A.D. 1550, the archaeological record of southeastern New Mexico reflects increasing regional and interregional variability. The Ceramic period, which is part of the Southwestern Formative period, begins with the advent of ceramics. The Ceramic period saw an increase in sedentism and decrease in population mobility, permanent structures, and the cultivation of rudimentary crops. In southeastern New Mexico, a very small percentage of the Ceramic period sites yield evidence of permanent structures. Material remains recovered at various sites have yielded evidence of a mixed subsistence of horticulture and hunter/gatherer food types (Sebastian and Larralde 1989:80). Sites in the area contain bison and deer, and to a lesser extent, small game animal remains. Sites on the Rio Hondo also revealed that the population also exploited river resources, such as fish and mussels (Sebastian and Larralde 1989:81). Another technological advancement in the Ceramic period was the advent of the bow and arrow, which increased hunting capabilities and allowed for a typically Archaic lifestyle coupled with the use of ceramics (Sebastian and Larralde 1989:82). Remains of temporary structures, such as pithouses and rock rings suggest a semi-nomadic lifestyle and included a range of subsistence strategies (Katz and Katz 1994:114).

Ceramics begin to appear in the region in about A.D. 500-750 with brownwares, including Jornada Brown, Middle Pecos Micaceous Brown, and Alma Plain (Katz and Katz 1994:113). Black-on-white pottery first appears in the area between A.D. 750-950, including Red Mesa Black-on-white and Cebolleta Black-on-white (Katz and Katz 1994:114). As the Ceramic period progresses, additional ceramic styles begin to appear. Chupadero Black-on-white, Three Rivers Red-on-terracotta, and El Paso Brownware appear in the region between A.D. 1075 and 1125 as do other graywares. As the Ceramic period comes to a close sometime between A.D. 1300 and 1375 (Katz and Katz 1994), more painted pottery, such as El Paso Polychrome and Chihuahuan wares begin to appear in the region.

The first true arrow points are documented in the Ceramic period, with styles such as the Scallorn, which has a concave base and corner notching. These points are reminiscent of earlier styles of projectile points, but get progressively smaller and thinner. The style of arrow points also begins to change in A.D. 1125 with the advent of side-notched rather than corner-notched points. Hunting continues to play a role during this period. Sites are located predominantly on ridges, cliffs, and arroyos to maximize hunting potential and the water resources of the area (Katz and Katz 1994:118).

The Eastern Jornada Mogollon

Perhaps one of the more influential groups in this area during the Ceramic period was the Jornada Mogollon. The eastern Jornada Mogollon sequence is divided into phases on the basis of changes in settlement patterns and ceramic assemblages. These phases include the Querecho (A.D. 950-1100/1150), Maljamar (A.D. 1100/1150-1300), and Ochoa (A.D. 1350-1450). Collins (1971:88) indicates that the eastern Jornada Mogollon diverged from the western Jornada Mogollon throughout these phases and probably maintained a greater reliance on hunting-and-gathering. Settlements of the Querecho phase are typically nonstructural, open sites that do not appear to correlate with any particular land forms and evidently functioned primarily as gathering campsites (Leslie 1979:187). Artifact assemblages consist of lithic and ceramic scatters and occasionally include groundstone fragments. Ceramics characteristic of this phase include El Paso and Jornada brownwares, Jornada Red-on-brown, San Andres Red-on-terracotta, and Chupadero Black-on-white (Collins 1971). According to Leslie (1979:190), a change in groundstone morphology from flat, slab metates and manos to oval basin metates and convex-faced manos occurred during this phase.

The Maljamar phase marks a shift in settlement patterns from the predominance of nonstructural camps to the establishment of pithouse villages. Although nonstructural sites are not unknown during this phase, they appear to be relatively few in number. Pithouse villages with as many as 20 to 30 individual structures, usually rectangular in shape, are reported. Leslie (1979:190) suggests that corner-notched projectile points dominate the lithic artifact assemblages until the end of this phase when side-notched types become more frequent. Ceramic assemblages include El Paso Brownware, El Paso Polychrome, Mimbres Black-on-white, Playas Redware, San Andres and Three Rivers Red-on-terracotta, and Chupadero Black-on-white (Collins 1971:88).

At the end of the Maljamar phase, there appears to be a hiatus in occupation that lasted approximately 50 years. At present, the reasons for this apparent abandonment are not clear. Leslie (1979:191) speculates that the inhabitants may have been driven out by Plains groups from the north, although there is little evidence to substantiate this claim. Following this hiatus, the area is reoccupied either by groups that formerly inhabited the area or by groups from areas west of the Pecos River. Leslie (1979) terms this a transitional or Post-Maljamar/Pre-Ochoa phase. During this time, there was a significant increase in ceramic tradeware types. In addition to the types represented at Maljamar phase occupations, Glaze A Red and Yellow, Salado and Chihuahuan polychromes, and Lincoln Black-on-red appear for the first time. Leslie (1979:191-192) suggests that the appearance of these types may represent the migration of indigenous groups, although the establishment of exchange relationships with northern Mexican, western Mogollon, and Rio Grande groups provides an alternative explanation.

The Ochoa phase follows this transitional period. It is differentiated primarily on the basis of changes in architectural construction and an apparent decrease in ceramic diversity. Unlike the previous phases, Ochoa phase settlements consist of clusters of single surface rooms or contiguous room blocks. Early Ochoa phase ceramic assemblages are thought to exhibit diversity similar to those of the Maljamar and transitional phase assemblages. By the end of this phase, however, Ochoa Indented and Chupadero Black-on-white represent the dominant ceramic types.

The end of the Ceramic period is marked by the appearance of Athabaskan groups in the Southwest (Katz and Katz 1994). The Athabaskans, specifically the Apache, were a highly nomadic group of almost exclusive hunter/gatherers. Unfortunately, because of this, the Apache left extremely little cultural remains behind; they rarely used ceramics and their lithic technology was such that it is indistinguishable from nondiagnostic lithics of previous prehistoric periods. With the introduction of the horse in the latter parts of the Protohistoric period, the Apache became increasingly mobile and therefore, more difficult to identify in the archaeological record. The sites that can be attributed to the Apache do have some identifying features, most notably tipi rings, and some diagnostic artifacts, including Ochoa Indented pottery, and two types of projectile points: Washita and Toyah (Katz and Katz 1994:122).

Protohistoric Period (A.D. 1540 – 1650 / 410 – 300 years ago)

Spanish contact begins in A.D. 1540 with the arrival of Coronado and documentation of the indigenous people in the region. Contact between Europeans and the indigenous people in this area were limited in the first hundred years, so the archaeological record does not reflect the effects of Spanish contact. Sites dating from the early Historic period, A.D. 1500 – 1600 still have the same characteristics as those from the Protohistoric period, but two new types of projectile points appear in the archaeological record: the Garza and a different style of Toyah (Katz and Katz 1994:123). In A.D. 1600, delineation occurs in the archaeological record as the Apache began to utilize metal to make arrow points (Katz and Katz 1994:123). Site types occur as agave roasting sites and short-term camping sites. In additional, several rock art sites and rock shelters may date to this period. In the spring of A.D. 1541, Francisco Vasquez de Coronado and his army of *conquistadores* began their search for the fabled wealth of Quivira. After leaving Pecos Pueblo, the expedition crossed the Llano Estacado north of the Melrose Range en route to the Querecho and Wichita villages of the Texas Panhandle and Southern High Plains region. According to one reconstruction of Coronado's route, the expedition crossed the plains via Frio Draw, passing through present Quay and Curry counties (Lintz et al. 1988:40; after Robinson 1974:45-46). On the return trip, a major portion of Coronado's command appears to have passed within a few miles of Melrose Range via the Portales Valley, before reaching the Pecos River south of present-day Fort Sumner.

Forty years later, in A.D. 1581, a small expedition of missionaries and soldiers, led by Fray Agustin Rodriguez and Captain Francisco Sanchez Chamuscado, traveled from the Galisteo pueblos to the Pecos River, reaching it somewhere in the vicinity of present-day Anton Chico (Sebastian and Larralde 1989:96; after Hammond and Rey 1966:88). The group then traveled down river before heading east to the Canadian River, where it is reported that they killed a number of bison (Sebastian and Larralde 1989:96). The return trip from the Plains to the Galisteo pueblos was apparently by the same route. The Chamuscado expedition returned to Mexico in the spring of A.D. 1582, leaving two friars (Rodriguez and Lopez) behind at the pueblo of Puaray to convert the Pueblo inhabitants (Hordes 1992:156; after Hammond and Rey 1966:6-13, 84-126; Sebastian and Larralde 1989:96).

Overlapping this period is the Spanish attempt to conquer the Indians. Multiple expeditions from A.D. 1580 to 1600 were aimed at Christianizing missions or were attempts at colonization. The ultimate goal of these expeditions was to convert the Indians so they could be used as a source of cheap labor and tribute (Katz and Katz 1985:17). Despite Spain's continued forays into southern New Mexico, the Pecos Valley remained unsettled during the seventeenth century. The Apaches claimed the area between the Rio Grande and the Pecos River, and the Spanish had little control over it (Katz and Katz 1985:27). Trade became an important factor in the Spanish dealings with the Indians. Pueblos in the region produced cotton and corn, which the Spanish traded or acquired through tribute offerings (Katz and Katz 1985:28). The trade activity introduced important items to the Indians in the area, most notably iron, livestock, and horses. The horse, in particular, revolutionized the lifestyle of the Apache, who now could raid with virtual impunity and could extend the range of their trading.

In the fall of A.D. 1582, growing concern for the friars' well being prompted a rescue expedition under the leadership of Don Antonio de Espejo and Friar Bernardino Beltran. The expedition traveled north along the Rio Grande as far as the Piro pueblos. At this point, it was learned that both friars had been slain by the inhabitants of Puaray. This news did not distract Espejo, who made lengthy excursions to Zuni and Hopi villages and to north-central Arizona before returning to Mexico in September 1583 via the Pecos River (Levine 1987:39-41; Sebastian and Larralde 1989:96; after Hammond and Rey 1966:27). While this expedition did not reconnoiter the plains extensively, there is an excellent account of the route down the Pecos provided by Espejo's chronicler, Diego Perez de Luxan (Levine 1987:41).

In A.D. 1590, an unauthorized colonization attempt was made by Gasper Castano de Sosa and a group of more than 170 immigrants (Levine 1987:41; Sebastian and Larralde 1989:96). This expedition followed the route north explored by Espejo some seven years before. De Sosa was subsequently arrested and sent back to Mexico for punishment (Hordes 1992:156; after Hammond and Rey 1966:28-50, 245-326).

Numerous other individuals explored the Southern High Plains during the Spanish exploration and early colonization periods and may have traversed areas near the Middle Pecos, though their exact routes are unclear. These include the travels of Capt. Francisco Leyva de Bonilla and Antonio Gutierrez de Humana, who in A.D. 1593 were in search of the fabled Quivira. Neither of these two explorers ever returned from the Arkansas River region of southern Kansas (Hays et al. 1989:103). In A.D. 1598, shortly after the first legal colonization of the Rio Grande province, Vicente de Zaldivar Mendoza was sent onto the plains by Juan de Oñate to acquire buffalo meat and other provisions (Sebastian and Larralde 1989:96). Oñate himself traveled to the plains in A.D. 1599 and 1601 and reported encountering Apaches and Plains village groups (Hays et al. 1989:103; Sebastian and Larralde 1989:96-97).

Previous Archaeological Research in the Study Area

In the mid-1970s, Southern Methodist University (SMU), Dallas, Texas, conducted the first professional archaeological work undertaken near the study area. SMU conducted a series of reconnaissance and testing projects, between 1974 and 1976, in relation to the planning for the proposed Brantley Dam and Reservoir. This work was funded by the Bureau of Reclamation under the newly established Archaeological and Historical Preservation Act of 1974. Approximately 33,000 acres were surveyed and 92 sites were documented (Bousman 1974; Henderson 1976). In 1975 and 1976, SMU returned to conduct additional survey on an additional 1,700 acres. During the survey, 19 sites were recorded, including documentation of McMillan Dam (Gallagher and Bearden 1980). In addition to that survey, subsurface testing was conducted on 15 sites.

Between 1980 and 1984, the Agency for Conservation Archaeology at Eastern New Mexico University [Portales], and New Mexico Archaeological Services [Carlsbad], New Mexico, undertook 12 archaeological clearance projects for the Bureau of Reclamation (Etchieson 1983). During these surveys, an additional 56 sites were documented in the study area. The Incarnate Word College, San Antonio, Texas, conducted two surveys, between 1983 and 1985, totaling 5,100 acres, again for the Bureau of Reclamation (Katz and Katz 1985). These two projects documented forty-three sites. A thorough analysis, also, was conducted on 172 previously recorded sites within the Carlsbad Basin in the Brantley Dam area. The scope of the previously recorded site analysis focused on prehistoric sites.

In addition to the larger archaeological surveys, several studies were produced during small oil and gas development projects that have also taken place in the Brantley Dam vicinity since the middle 1970s (Laumbach 1975; Mimiaga 1976), and into the 1980s (Hunt 1983; Self 1983) and 1990s (Frizell et al. 1994; Martin 1992; Sanders 1994). These projects frequently involved previously recorded sites from the Brantley Dam studies.

In 1999, Sagebrush Consultants, Ogden, Utah, conducted a 1,500-acre survey along the Pecos River between Brantley Dam and Avalon Dam as part of Phase II of the Brantley and Avalon Reservoirs Research Management Plan and Environmental Report (Weymouth and Polk 2000). Sixteen previously recorded sites were revisited and 50 previously unrecorded sites were documented. The sites were not fully recorded and the Bureau of Reclamation contracted Geo-Marine, Inc., El Paso, Texas, through Statistical Research, Inc., Tucson, Arizona, to complete the work.

The project identified and assessed cultural resources on lands being transferred from the U.S. Bureau of Reclamation to the Carlsbad Irrigation District. This project was undertaken at the request of Carla Van West of Statistical Research, Inc., Tucson, Arizona, for Signa Larralde of the Bureau of Reclamation, Albuquerque, New Mexico. The work was conducted to comply with Sections 106 and 110 of the National Historic Preservation Act (NHPA) of 1966 (as amended through 1992), the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990, the New Mexico Graves law, and the Archaeological Resources Protection Act (ARPA) of 1979. The survey and assessment project involved four phases of investigations.

A series of specific questions can be formulated for each research issue. Compilations of archaeological information needed in the Carlsbad area has been developed by Geo-Marine, Inc in their nomination

“Prehistoric Properties in the McMillan-Avalon Segment of the Middle Pecos River: National Register of Historic Places Multiple Property Documentation Form
And CORRESPONDING nominations” These research questions are applicable here at LA-154410. Some have been modified. These research domains define the parameters of research questions, and it’s possible that the data obtained may not be able to address every question.

1. Settlement Patterns
    - How does LA-154410 fit into the overall pattern of settlement in the region.

2. Seasonality
    - What is the season or seasons of site usage?
    - What is the duration of site usage?

3. Demography
    - What is the inferred size of the residential group?
    - Can the age grade and gender structure reflected by activities and artifacts on site?

4. Subsistence
    - What is the range of plant and animal resources consumed?
    - How were these resources procured and processed?
    - Were resources used immediately or stored and consumed later?
    - Can tool use-wear patterns provide insights into processing patterns?
    - Can residues and chemistry identify what subsistence materials were probably processed?

5. Trade
    - What kinds of non-local materials (marine shells, jewelry, pottery, minerals, flints/obsidians, feathers, medicinal plants, pipes) occur on LA-154410?
    - What do these materials tell us about direction of long distance contacts?
    - What does the frequency of these items reveals about the nature (direct, indirect, down-the-line, etc.) of long distance contacts?

6. Chronology
    - How many components are represented at LA-154410?
    - What is the relative age of the components based on diagnostic pottery and point forms?
    - Are there datable materials available to provide age determinations for components?
    - What is the absolute age of occupations on the site?

7. Environmental Change
    - What were the paleoenvironmental conditions like during periods of occupations?
    - What environmental proxies exist on or near site available to reconstruct environmental conditions?
    - What evidence exists for environmental change in the region?
    - When were the major mesic and xeric periods in the past?
    - Does the timing of environmental change coincide with cultural change?

8. Typology
    - Does the artifact assemblage reflect use of generalized or specialized implements?
    - If distinctive tools (pottery and projectile points) are present, do they change sufficiently to be a cultural diagnostic marker?

- Is diagnostic tool use sufficiently brief to serve as a time marker?
- Which tools best serve as time markers and when were their forms adopted/abandoned?

9. Intrasite Patterning
    - What is the internal structure and organization of activities on site?
    - Is there a correlation in the spatial distances between structures?
    - Does spatial consistency exist in the placement of structures, and specific activity areas?
    - Are activities structured by landform setting?

10. Cultural Affiliations
    - What cultural periods are reflected by diagnostic materials on site?
    - Do the materials represent a single, isolated component, multiple isolated components or multiple non-isolated palimpsests?
    - What evidence exists to identify components that are not reflected by cultural diagnostic materials?

11. Cross-Cultural Interaction
    - What inferences can be derived from the occurrence of foreign goods in the region?
    - How strong are the linkages between people residing in separate areas?
    - Do the outside connections reflect group immigration, or selective adoption of ideas and materials by indigenous people?
    - Is the project area a core residential region or a joint-use co-area shared (seasonally?) by multiple groups?

12. Raw-Material Procurement
    - What resources are available for people to utilize and how were they distributed on the land?
    - What resources were people actually using?
    - Is there a discrepancy in distance or direction between the choices in resource use?
    - What factors may have affected the decision-making process for raw material procurement?

13. Technology
    - What supporting technologies existed to fashion tools and features?
    - What technological steps were used to make tools and features?
    - What organization or labor was involved in making tools and features?
    - What knowledge and skills were used to make tools and features?
    - What stages of production occurred in various parts of the landscape?

Data Recovery Plan

The proposed data recovery plan seeks to conduct limited excavations at LA-154410 on the Seven River Well Pad Waterlines Project. This site was chosen for the following reasons. First, LA-154410 would experience some degree of damage from construction work and traffic, and therefore the cultural deposits there are at risk. Second, surface inspection of these areas has identified dense scatters of fire cracked rock and some lithic. This has led to the hypothesis that subsurface cultural deposits may be present.

Finally, the waterline that is to be constructed for water delivery needs to be laid mostly down the center of a deeply incised dirt road that runs though the site. There are areas where the pipeline is outside of the road but still within a meter of the roadway. The road appears to be below the cultural surfaces but this cannot be proven until a testing plan has been put into action. Verification or rejection of the predicted subsurface features will allow for an assessment of the site and give direction for the waterline location. Additionally, this data could increase the archaeological and educational value of the site by providing a window into the life ways and human ecology of the prehistoric period along the Pecos River in southern New Mexico.

Before any excavations would ensue, controlled surface collections at each excavation unit and all artifacts within the whole APE on LA-154410 will be made. All surface artifacts will be pin flagged. Diagnostic artifacts will be GPS-provenienced. Two 1 meter by 1 meter units will be excavated. These units will be excavated until sterile soil is reached. The locations of these units are as follows. One unit within feature 1 and one unit within feature 2. There will also be a 2 foot backhoe trench excavated down the proposed pipeline rout after the manual excavation of feature 1 and feature 2. The trench will be 30 inches deep and it will run the entire length of LA-154410 along the pipeline route.

If any subsurface features are located they will be excavated and recorded according to accepted archaeological practices. Excavation will leave most of the site intact and preserved. Units will be hand excavated at arbitrary 10-centimeter levels down to sterile soil. Previous work in the area suggests that sterile soil will be reached at approximately 15-25cm below ground surface. Excavation fill will be screened through ¼" hardware cloth or 1/8" hardware cloth if features are encountered. Soil samples from features will be collected for flotation analysis and/or radiocarbon dating. This analysis will be carried out by archaeological contractor. Samples of carbonized material will be collected and wrapped in aluminum foil.

All units will be mapped. For all feature units, artifacts encountered will be mapped, collected, and bagged according to unit, level and feature provenience. Based on previous excavations in the area and the presence of surface artifacts, it is anticipated that the following artifact classes will be recovered: chipped stone artifacts; flaking debris; and fire cracked rock. All opened units will be photographed using digital photography. Each photograph will include a metric scale, north arrow and mug board indicating excavation unit and number. Additional photographs will be taken to document the stages of fieldwork. Soil profiles for all units will be produced and feature plan views and profiles will be drawn. Natural stratigraphy and mapped feature fill will be labeled using a Munsell color chart and standard terms for soil texture. Once excavations are complete, all units will be back filled and all items will be removed from the site except a few datum stakes.

It is not anticipated that human remains will be encountered in these excavations. However, if they are, then excavation of that unit will immediately cease and Reclamation will be notified immediately. Law enforcement will be notified and State Historic Preservation Officer (SHPO) will be contacted by Reclamation. Consultation with Native American tribes pursuant to the Native American Graves Protection and Repatriation Act regarding inadvertent discovery will be undertaken by Reclamation. Tribal consultation regarding the disposition of the remains, including re-burial, will also be undertaken by Reclamation. In addition, tribal consultation regarding the implementation of this data recovery project will be undertaken pursuant to Section 106 of the National Historic Preservation Act. If any subsurface anomalies are identified during construction work on the waterline will stop until consultation over the subsurface cultural features has been concluded.

Monitoring

If artifacts are encounter during monitoring they will be given a point province, bag and label. If any features are encountered work will stop until a mitigation plan is put into place of this feature. Reclamation Soil samples from this feature will be collected for flotation analysis and/or radiocarbon dating. This analysis will be carried out by archaeological contractor. Samples of carbonized material will be collected and wrapped in aluminum foil.

Analysis

Subsequent to the excavations, all cultural material will be temporarily transported to the office of the contractor for analysis. Analysis will address the interrelated research domains.

Lithic Analysis

Analysis of ground stone and chipped stone will address the domains of subsistence resource use and social use of space on LA-154410. A descriptive analysis will include data on raw material type, tool form (e.g. mano or metate), number of worked facets and recycling. Chipped stone tools will be described by form, function and raw material type and flaking debris will be described by raw material type and tool production phase. The relative presence of tool types such as manos, metates, unifacial tools, retouch flakes and bifaces will allow inferences regarding the respective roles of hunting, crop cultivation and food processing. Analyses on tool morphology, raw material type and flaking debris characteristics will allow inferences regarding raw material procurement, tool production, use and discard. Further, these data, in combination with feature data, will aid in defining the life ways of prehistoric cultures in the project area. This in turn will allow inferences about the use of social space by the site's inhabitants.

Ceramics

If any ceramics are recovered from LA-154410 they will be analyzed in terms of surface and temper treatment, cultural historical type, vessel portion (lip, neck, body and base) and vessel type (e.g. jar, bowl). Sherds will also be measured by maximum length, width and thickness. Collectively, ceramic data will be useful in making inferences about feature chronology, function, and to help address the question of intra-site variability of activity areas.

Curation and Report.

Once analysis is complete, the cultural remains will be submitted to the Laboratory of Anthropology in accordance with their procedures manual for submission of archaeological artifacts and records. A draft report will not be submitted to SHPO for review. Pending revisions, a final report will then be submitted to SHPO. Reclamation recommends that the contractor present finding in a public form.

Personnel

The project will be directed by a contractor of NMISC choice. The contractor will follow accepted archaeological practices while conducting this excavation.

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