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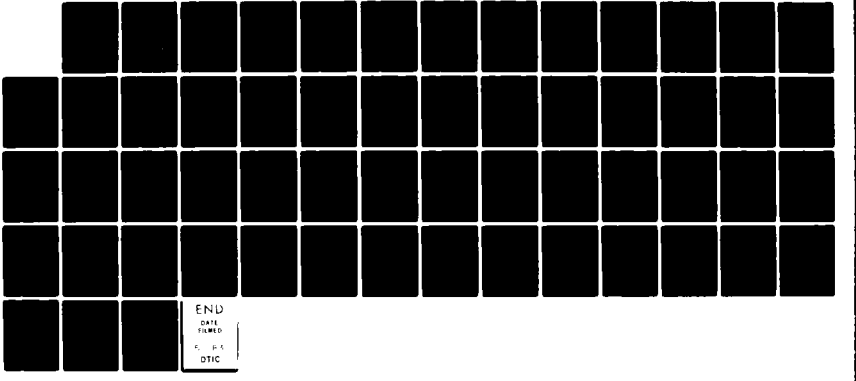

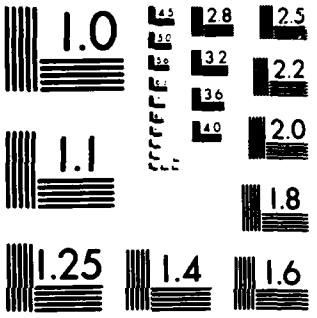

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REPORT ON AN ARCHEOLOGICAL SURVEY OF FIVE LOCAL PROTECTION PROJECT DAMS AND ASSOCIATED DRAINAGE AND DIVERSION CHANNELS IN NORTHWEST EL PASO, TEXAS

By

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PREPARED FOR

U.S. ARMY DISTRICT

CORPS OF ENGINEERS

ALBUQUERQUE, NEW MEXICO

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Within five local protection dams in northwest El Paso, Texas, were found 18 prehistoric sites. Sites contained fired cracked rocks, brownware ceramics and lithics. Eight of the sites were believe to be eligible for inclusion in the National Register.

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Mesilla Phase Mogollon, ceramics, lithics

c. COSATI Field/Group

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ABSTRACT

Five local protection dams, ponding areas, and associated drainage and diversion channels in northwest El Paso, Texas, were examined for archeological and historical resources for the Corps of Engineers, Albuquerque District. This terrain covers some 738 acres of which 608 acres were located in the terrace remanents and arroyos away from the river and 130 acres were located on the toes of the terraces and at the mouths of arroyos on the edge of the river floodplain. Eighteen prehistoric and no historic sites were located. All of the sites above the edge of the floodplain were lithic scatters or firecracked rock hearths. Of the three ceramic bearing sites, all were at the edge of the floodplain, all had firecracked rock hearths, and all had only brownware pottery. It is suggested that eight of the sites are eligible for nomination to the National Registry of Historic Places.

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REPORT ON AN ARCHEOLOGICAL SURVEY OF FIVE LOCAL PROTECTION PROJECT DAMS AND ASSOCIATED DRAINAGE AND DIVERSION CHANNELS IN NORTHWEST EL PASO, TEXAS

By

REX E. GERALD, Ph.D.

Introduction

In August 1976 an archeological survey was initiated of five local protection dams and associated drainage and diversion channels in northwest El Paso, Texas, for the U.S. Army Corps of Engineers, Albuquerque District (Map 1). Two of the dams--Thorn Drive Dam and the Mulberry Dam complex--are already in place but crest elevation will be raised and new spillways constructed. The other three dams--Mesa, Keystone, and Oxidation Pond Dams--are yet to be constructed. Drainage channels or outlet conduits lead from each dam to one or another of the diversion channels which are the Borderland, the Highway, and the Buena Vista Diversions.

Because relatively few prehistoric archeological resources are known between the Franklin Mountains and the Rio Grande in the general area of northwest El Paso this survey offered a welcome opportunity to examine the 738.1 acres encompassed by these structures. Unfortunately, only about two-thirds of this

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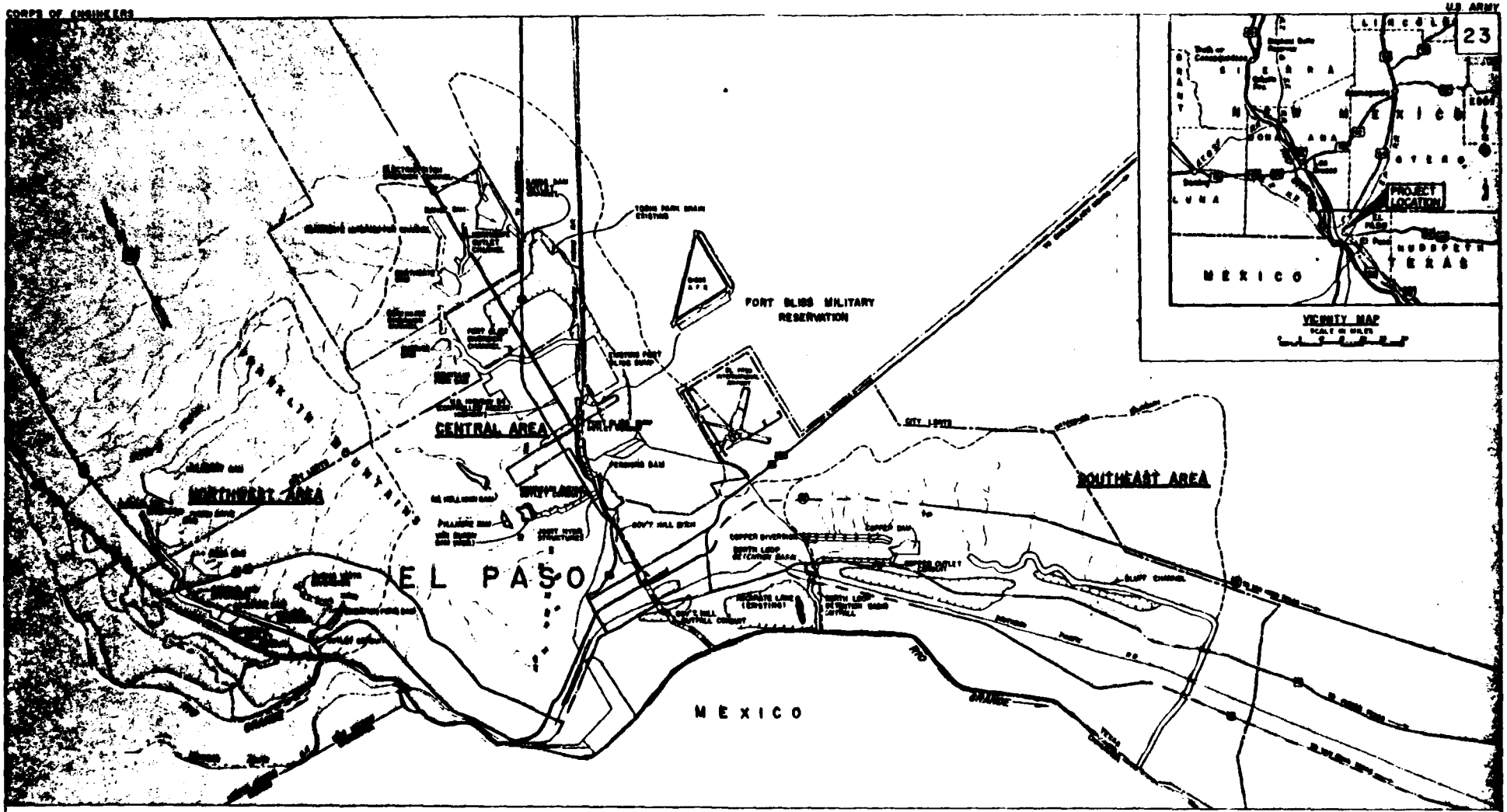

LEGEND

EXISTING	PROPOSED	COMPLETED

FLOOD CONTROL PROJECT
RIO GRANDE BASIN

EL PASO, TEXAS

PROJECT MAP

SCALE IN FEET

DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
ALBUQUERQUE, NEW MEXICO
REVISED SEPTEMBER 30, 1975

area has remained undisturbed by modern earthmoving activities.

Legal Justification For Studies of the Cultural Environment

Legally sanctioned recognition of the importance of cultural and historical resources dates back to the beginning of the present century when, in 1906, Congress passed the "Act for the Preservation of American Antiquities" (34 Stat. 225, 16 U.S.C. 431 et seq.). This was followed by the "Historical Sites Act of 1935" (49 Stat. 666, 16 U.S.C. 461 et seq.) and the "National Historic Preservation Act of 1966" (80 Stat. 916, 16 U.S.C. 470 et seq.), which broadened the coverage with regard to historic resources, and by the "National Environmental Policy Act of 1969" (83 Stat. 852, 42 U.S.C. 4321 et seq.) which placed the products of human behavior, present and past, in a setting of natural environment and provided for the preservation of important historic, cultural, and natural aspects of our national heritage. These acts were drawn together in a statement of Federal policy regarding the protection and enhancement of the cultural environment, and the responsibilities of Federal Agencies in this regard were specified by Executive Order 11593 (13 May 1971). An important Federal act relating to antiquities is the "Historical and Archeological Preservation Act of 1974" (88 Stat. 174, 16 U.S.C. 469 et seq.) which provides for financial support to accomplish the requirements specified in previously enacted laws.

From the statement of purpose of the "National Environ-

mental Policy Act of 1969", i.e., "to enrich the understanding of the ecological systems and natural resources important to the Nation", and from the "Declaration of National Environmental Policy" of that same Act, specifically the policy to "preserve important historic, cultural, and natural aspects of our national heritage. . .", it is clear that man's relationship to the natural environment is recognized and that information concerning that relationship in the past, as well as in the present and future, is considered to be of national importance.

Natural Environment

By Thomas C. O'Laughlin

The study area is located in northwest El Paso, Texas, on an outwash alluvial slope between the flood plain of the Rio Grande river and the Franklin Mountains to the east. The area is within the Mexican Highland Section of the Basin and Range physiographic province in which tilted block fault ranges were uplifted in the late Tertiary period and the intermountain basins or troughs thus created filled with detritus from erosion of uplands in the Pleistocene epoch (Kottlowski 1958). The ancestral Rio Grande began to cut its present valley into the basin sediments during the middle Pleistocene and has since aggraded or degraded its bed in response to the waxing and waning of glacial-pluvial cycles (Kottlowski 1958; Metcalf 1967).

The Franklin Mountains rise abruptly from the valley floor some two miles east of the study area to an average

height of 3000 feet with the highest peak in the range reaching an altitude of just over 7000 feet above sea level. Rocks of Precambrian, Paleozoic, Cretaceous, and Tertiary age are exposed in the Franklin Mountains and are mostly sandstone, quartzite, and rhyolite with granite and andesite intrusions (McAnulty 1967). Quaternary deposits lap up on the flanks of the mountains and are present as a dissected terrace above the entrenched Rio Grande in the project area. To the west of the project area, the basin sediments are nearly level and are uninterrupted for many miles to the west and north on what was once the bed of Pleistocene Lake Cabeza de Vaca (Strain 1966).

Soils near the mountains and above the flood plain in the study area have developed in recent times and are shallow over calcium carbonate deposits or deep and gravelly throughout (Jaco 1971). Soils on the flood plain of the Rio Grande have formed in alluvium recently laid down by the river and are deep soils that have loamy very fine sand to silty clay loam underlying material.

The vegetation of the area is similar to much of western Texas, southern New Mexico, and northern Mexico, and is within the boundary of the Chihuahuan Desert described by Shreve (1942). The drier slopes of the Franklin Mountains and the lower piedmont slopes and terraces in the vacinity of the project area are sparsely covered with lecheguilla (Agave lecheguilla), torrey yucca (Yucca torreyi), soaptree yucca (Yucca elata), prickly pear cactus (Opuntia spp.), ocotillo (Fouquieria splendens), sotol (Dasylirion wheeleri), and creosotebush (Larrea tridentata). The protected canyons in the higher

portions of the Franklin Mountains are heavily vegetated with wait-a-minute (Mimosa biuncifera), desert willow (Chilopsis linearis), hackberry (Celtis reticulata), algerita (Berberis trifoliolata), beargrass (Nolina microcarpa), and some oak (Quercus spp.) and juniper (Juniperus monosperma). Wait-a-minute, mesquite (Prosopis juliflora), desert willow, white thorn (Acacia constructa), and small-leaved sumac (Rhus microphylla) are common in the larger arroyos on the dissected slopes below the Franklin Mountains. Mesquite, soaptree yucca, and creosotebush occur together in sandy areas on terraces and in arroyos. There is some evidence to suggest that the slopes below the Franklin Mountains were once covered by grass and that the desert shrub vegetation was much more restricted than it is now (York and Dick-Peddie 1969).

The vegetation along the Rio Grande is very disturbed from cultivation and flood-control activities and probably very different from what it was before non-Indian settlers arrived in this area (Campbell and Dick-Peddie 1964). Many areas along the river were probably barren except for an occasional cottonwood (Populus fremontii), or Godding willow (Salix gooddingii) and salt grass (Distichlis stricta).

Common mammals recorded for the area include desert cottontail (Sylvilagus auduboni), black-tailed jackrabbit (Lepus californicus), ground and rock squirrels (Spermophilus spp.), pocket mouse (Perognathus sp.), kangaroo rat (Dipodomys sp.), white throated wood rat (Neotoma albigula), coyote (Canis latrans), striped skunk (Mephitis mephitis), and mule deer (Odocoileus hemionus) (Ederhoff 1971). Blair (1950)

reviews other common faunal elements of the Chihuahuan Desert.

The climate for the area is semiarid mesothermal, and the average annual precipitation is 200 mm (7.9 inches) with about half of that falling during July, August, and September (U.S.D.C. 1969). Summer precipitation usually takes the form of violent thunderstorms of short duration while winter precipitation tends to be slow and penetrating. Daytime and nighttime temperatures often differ considerably. The average maximum temperatures range from 95.4 degrees F in June to 56.3 degrees F in January.

Human History of the Study Area

It is assumed that the history of human adaptive strategies in the study area parallels that of surrounding areas with but minor adjustments in chronology. Early Man, represented by a single Folsom point and six possibly contemporaneous snubnosed scrapers found some 12 miles north of the study area, is undated in this region. The Archaic period may be represented by the aceramic lithic scatters found in the upland areas along the river (Yoe ms; Quimby and Brook 1967) and probably is represented by some of the excavated sites located 40 miles or so to the north (Greiser 1973; Beckett 1973), to the northeast (Wimberly and Eidenback 1972), and to the east (Cosgrove 1947; Whalen in press). This largely prehorticultural period ends some time after the middle of the first millenium A.D. in the El Paso area.

The Formative period, manifested as the Mesilla and the El Paso Phases, with an intervening Dona Ana Phase that is

apparently not represented locally, is characterized by the most complex social system to have evolved aboriginally in the immediate El Paso area. The earlier phase, the Mesilla, which is dated between about 800 and 1100 A.D., is characterized by a greater dependence upon horticulture, the construction of permanent dwellings in the form of round or rectangular pit-houses, settlements that are usually of small village size (3.5 hectare or less) or smaller (Whalen in press), and undecorated, direct rim ceramics of simple shapes (Lehmer 1948; Whalen in press). Whalen (in press) finds evidence from which to suggest that the Mesilla Phase subsistence pattern was a more general one than that of the succeeding El Paso Phase and that a broad range of subsistence activities was pursued in the immediate vicinity of each site.

The El Paso Phase, which is dated at about 1200 to 1400 A.D., is not known to be represented in the immediate project area but it is known from a site directly across the Rio Grande, and from others some twenty miles upstream and on the east side of the Franklin Mountains (Whalen in press). This phase is also characterized by a dependence on horticulture combined with the gathering of wild plant foods and hunting, permanent dwellings in the form of adobe pueblos arranged individually and in contiguous lines beside plazas, settlements that range in size up to large villages covering as much as 10 ha (Whalen in press), and brownware pottery decorated in black and red and in large sized jars with everted, thickened rims and a variety of other less common forms. Evidence of extra areal contacts are most common during this prehistoric phase.

The time horizon between the end of the El Paso Phase at about 1400 A.D. and the beginning of Spanish contact is not represented in the known archeological remains in the El Paso area. It is presumably a time of climatic deterioration and population decline.

The Spanish explorers who penetrated the area in the 1580's found only nomadic hunting and foraging bands of Suma and Manso (Gerald 1975). Piro and Tompiro pueblo horticulturists were brought to the Paso del Norte area by Spanish missionaries to assist in the conversion of the Manso in 1657 or 1658 and in the erection of a permanent church, Nuestra Senora de Guadalupe de los Mansos del Paso del Norte, between 1662 and 1668. On 18 September 1680 some 2000 Spaniards and friendly Pueblo Indian refugees from the pueblo revolt in New Mexico reached the area of the present project and settled at a place on the east side of the Rio Grande called La Salineta. The site was initially considered to be at the southern limits of New Mexico and therefore the line beyond which the governor and council could not go without abandoning their realm and loosing authority over the refugees. It was eventually discovered that the first governor of New Mexico, Don Juan de Onate, actually issued a proclamation while still on the west side of the Rio Grande and took possession of a domain that began where his colonists reached the river at a spot named La Toma (the place of the taking of possession) some 31 miles below the pass to the southeast. With this realization the refugees abandoned La Salineta and eventually settled for 12 years in several localities stretching from

Mission Guadalupe down to La Toma (Gerald 1975). La Salineta is one of the oldest if not actually the oldest European derived settlement within the boundary of the present state of Texas and is therefore of considerable historical importance. Unfortunately, concrete evidence of its location has not yet been found.

Spaniards, Mexicans, and Indians continued to traverse the study area during the historic period but there is no indication of permanent settlement there until about the middle of the nineteenth century when the Mexican government established a customshouse at a place that came to be called La Frontera located on the east side of the river immediately north of Sierra de Christo Rey (formerly called Cerro de los Muleros) (Emory 1855). The construction of the Atchison, Topeka, and Santa Fe Railroad track and its paralleling drainage ditches, or of highway U.S. 80 (Doniphan Drive) may have destroyed the site. The Keystone Outlet Conduit will utilize the existing drainage ditch on the west side of the railroad track.

Anglo and Mexican-American occupation began in the vicinity of the present project by the beginning of the twentieth century, if not before, but no early structures are known that will be affected by the present construction. Several recently constructed dwellings in the Oxidation Pond Dam area must be removed before that structure can be fabricated.

Techniques and Field Conditions

The field techniques employed were the ones that have been found to give good results in the El Paso area. The area to be surveyed was traversed on foot at 15 to 20 meter intervals utilizing diazo prints of aerial photographs on which to record traverses, artifacts, and activity areas. Activity areas and isolated artifact occurrences are recorded on the face of the diazo print and are described on the reverse side, a practice that is made possible by the scale of the aerial photos--1:3600--and the sparsity of cultural remains.

Most of this survey was carried out by a two-man team with individuals traversing the linear drainage and diversion ditch areas in zigzag fashion. Eight man-days were spent in the field on this project. Field conditions were ideal for making observations--there were no days of intense heat, blowing sand, or other obstruction to careful observation.

Results of the Archeological Survey

Eighteen sites were recorded on this survey (Table 1). Seven of these include hearths of fire-cracked rock, of which three have El Paso Brown sherds and other artifacts in association and one may have a pithouse exposed in an arroyo. All other sites are manifested as one or more hearths of fire-cracked rocks and/or as lithic scatters. A site is defined as an isolated activity area or two or more activity areas within 50 meters of one another and an activity area is defined as a locality in which one or more features (hearths,

TABLE 1

Attributes of Archeological Sites in Northwest El Paso, Texas

Site	Hearths	El Paso Br.	Chipped Stone Tools	Cores	Used Flakes	Debitage	Miscellaneous	Site Area (Sq. Meters)	Topography	Plant Association	Total Recovery	4.5 Man Field Crew Days Mitigation Recommended
31:106:2:20 Mulberry #2	-	-	1	1	-	1	-	6	Ridge Top	Lecheguilla, Creosote	0.1	
31:106:2:21 Mulberry #3	-	-	2	-	1	2	-	1,080	Disected Terrace	Creosote Mesquite	0.2	
31:106:2:22 Mulberry #4	-	-	-	-	-	4	-	6	Disected Terrace	Creosote	0.1	
31:106:2:23 Mulberry #5	-	-	1	-	3	-	-	6	Disected Terrace	Creosote	0.1	
31:106:2:24 Mulberry #6	-	-	-	1	-	13	-	94	Disected Terrace	Creosote	0.2	
31:106:2:25 Mulberry #7	-	-	1	1	-	1	-	6	Terrace	Creosote	0.1	

TABLE 1 CONT.

Site	Hearths	El Paso Br.	Chipped Stone Tools	Cores	Used Flakes	Debitage	Miscellaneous	Site Area (Sq. Meters)	Topography	Plant Association	Total Recovery	4.5 Man Field Crew Days Mitigation Recommended
31:106:2:26 Mulberry #8	-	-	-	1	-	3	-	9	Disected Terrace	Creosote	0.1	
31:106:2:27 Mulberry #9	-	-	-	1	-	1	1	6	Disected Terrace	Creosote	0.1	
31:106:2:28 Mesa #1	-	-	-	2	-	3	-	94	Terrace Remanent	Creosote	0.2	
31:106:2:29 Mesa #2	1	-	-	-	-	1	-	16	Sanddunes on Terrace	Creosote, Torrey yucca	0.5	0.5
31:106:2:30 Borderland #1	-	-	1	-	1	2	-	94	Terrace Remanent	Creosote	0.1	
31:106:2:31 Keystone #1	2	6	1	-	-	-	-	594	Arroyo Mouth	Creosote, Mesquite	2.0	2.0

TABLE 1 CONT.

Site	Hearths	El Paso Br.	Chipped Stone Tools	Cores	Used Flakes	Debitage	Miscellaneous	Site Area (Sq. Meters)	Topography	Plant Association	4.5 Man Field Crew Days: Total Recovery	4.5 Man Field Crew Days: Mitigation Recommended
31:106:2:32 Keystone #2	2	-	7	4	-	31	-	14,500	Sanddunes on Terrace	Creosote, Mesquite Soaptree yucca	2.0	2.0
31:106:2:33 Keystone #4	9	30#	4	2#	#	6#	Pithouse, Pestle, Mano	40,000	Sanddunes at Arroyo Mouth	Creosote, Fourwing saltbush, Mesquite, Soaptree yucca	300.0	100.0
31:106:2:34 Keystone #5	2	2	-	-	-	-	Mano	4,264	Sanddunes at Arroyo Mouth	Creosote, Mesquite, Soaptree yucca	60.0	20.0
31:106:2:35 Highway Div. #1*	1	-	-	-	-	-	-	12	Sanddunes on Terrace	Creosote, Mesquite, Soaptree yucca	0.5*	0.5*
31:106:2:36 Highway Div. #2	1	-	-	-	-	-	-	19	Sanddunes on Terrace	Creosote, Mesquite, Soaptree yucca	0.5	0.5

TABLE 1 CONT.

Site	Hearths	El Paso Br.	Chipped Stone Tools	Cores	Used Flakes	Debitage	Miscellaneous	Site Area (Sq. Meters)	Topography	Plant Association	Total Recovered	4.5 Man Field Crew Days Mitigation Recommended
31:106:2:37 Highway Div. #3	1	-	-	-	-	-		10	Sanddunes on Terrace	Creosote, Mesquite, Soaptree yucca	0.5	0.5
										Total Crew Days	367.3	126.0

A tabulation was not kept of all items observed.

* This site is probably outside the area that will be disturbed by the contruction of the Highway Diversion Channel.

dwellings, etc.) occur or in which three or more artifacts occur within two meters of one another. Isolated artifacts and possible artifacts were recorded when encountered, except for a few flakes and flake-like fragments of rhyolite or other course grained stone, under the assumption that activity areas having lower concentrations of artifacts than those specified above might be identified but such proved not to be the case; therefore, these isolated occurrences are not reported here.

Non-ceramic artifacts characteristic of particular time horizons were not encountered, except for recent trash materials. This is presumably a result of the size of the sample which apparently did not encompass non-ceramic dwelling areas or other localities of concentrated diverse activities or else such sites do not exist in the area. It is tempting to assume that some of these non-ceramic sites were produced by Archaic man but the near absence of Archaic sites in the intensively surveyed 103 square mile Fort Bliss Maneuver Area II in the Hueco Bolson twenty-five miles to the east reduces the probability that such assumption is valid (Whalen in press). No evidence indicative of earlier time horizons was noted.

Three sites (EPCM 31:106:2:31, 33 and 34, respectively) have been assigned to the early ceramic, Mesilla Phase because ceramics of that phase were found on them. All three of these sites are located on alluvial fans at the mouths of arroyos and at least one of them (31:106:2:33) has a shallow, flat-bottomed, charcoal filled pit, recently exposed by arroyo cutting, that may be a dwelling. No sherds or other evidence of El Paso Phase or later aboriginal occupation was encountered, and no

evidence of Spanish Colonial, Mexican, or other occupation of the area by participants in European or European derived societies more than about 30 years old were found. Modern trash is abundant in many areas, however.

The attributes tabulated in Table 1 and listed in the site descriptions are of several different types, including features and artifacts, estimates of the area covered by each site, topography on which the site is located, and the plant association on the site. The features are hearths of fire-cracked rocks and one possible pithouse (tabulated under "miscellaneous"). Artifacts are listed as El Paso Brown (Lehmer 1948) and as several general classes of lithics; none of the artifacts other than the pottery are datable at present. An attempt was made to locate all artifacts on the less productive sites but some were undoubtedly missed. On the more productive sites some artifacts may have been missed and no attempt was made to record all used flakes and debitage on the largest and most productive site, 31:106:2:33 (Keystone #4). Estimates of site sizes are provided but there are some inconsistencies that could have been eliminated had larger scale aerial photos been used and more time devoted to the plotting of artifact distributions. The sparseness of artifacts suggests that very little activity took place at most sites, therefore, it was felt that the devotion of more time to the acquisition of more accurate estimates of the size of such sites was unwarranted.

The entries under the heading of topography reflect the relative homogeneity of the terrain encompassed by this survey.

Sites in sanddune areas were easily recognized because the fire-cracked rocks and artifacts contrasted with the fine texture of the sand while sites on the desert pavement of the terrace tops were difficult to discern because of the similarity in size and texture of the artifacts to the background material. It was felt intuitively that sites were more likely to be found in sanddune areas than elsewhere but negative evidence was not collected with which to test such an assumption.

Plant associations are presented in the tabulation with the listing preceeding from the most common to the least common of the perennial plants. Creosotebush is ubiquitous and is the most common perennial on all sites except the ridgetop locality. No attempt was made to obtain accurate estimates of plant density, cover, etc.

Archeological Site Descriptions

EPCM 31:106:2:20 (Mulberry Dam Site #2) (UTM Zone 13:353000E, 3526350N)

Uniface chert scraper, chert core and rhyolite flake found on a ridge in a lecheguilla association. Area: 6 square meters.

EPCM 31:106:2:21 (Mulberry Dam Site #3) (UTM Zone 13:353350E, 3526200N)

Uniface chopper on a tabular block of purplish quartzite, uniface chopper on large flake of black chert with two debitage flakes from it, and one used flake on a disected terrace in a creosotebush-mesquite plant association. Area: 1080 square meters.

EPCM 31:106:2:22 (Mulberry Dam Site #4) (UTM Zone 13:353400E, 3526550N)

Four debitage flakes of black quartzite on a disected terrace in a cresotebush plant association. Area: 6 square meters.

EPCM 31:106:2:23 (Mulberry Dam Site #5) (UTM Zone 13:353300E, 3526900N)

One scraper and three used flakes of black quartzite on a disected terrace between arroyos in a creosotebush association. Area: 6 square meters.

EPCM 31:106:2:24 (Mulberry Dam Site #6) (UTM Zone 13:353200E, 3526850N)

One core and nine flakes of black chert and four flakes of purple quartzite on a disected terrace between arroyos in a creosotebush association. Area: 94 square meters.

EPCM 31:106:2:25 (Mulberry Dam Site #7) (UTM Zone 13:353000E, 3526950N)

Triangular limestone uniface chopper, half of an obsidian nodule with flakes removed, and a quartzite decortication flake on a terrace in a creosotebush association. Area: 6 square meters.

EPCM 31:106:2:26 (Mulberry Dam Site #8) (UTM Zone 13:353000E, 3526650N)

Core of black quartzite and three flakes on a disected terrace in a creosotebush association. Area: 9 square meters.

EPCM 31:106:2:27 (Mulberry Dam Site #9) (UTM Zone 13:353050E, 3526700N)

One core and one flake of black quartzite and one obsidian nodule on a disected terrace in a creosotebush association. Area: 6 square meters.

EPCM 31:106:2:28 (Mesa Dam Site #1) (UTM Zone 13:352050E, 3524250N)

Two cores, one of rhyolite and one of quartzite, one obsidian flake from a nodule, and two chert flakes scattered over an area about 30 m in diameter on the top of a small terrace remanent in a creosotebush plant association. Area: 94 square meters.

EPCM 31:106:2:29 (Mesa Dam Site #2) (UTM Zone 13:352050E, 3524150N)

Hearth of fire-fractured rock, ca. 5 meters in diameter, and one chert flake found on a sandy terrace in a creosotebush and Torreyi yucca association. Area: 16 square meters.

EPCM 31:106:2:30 (Borderland Diversion Site #1) (UTM Zone 13:351350E, 3524200N)

Rhyolite end scraper, one utilized flake of dark quartzite, one rhyolite and one dark quartzite flake found over an area of ca. 30m diameter on a terrace remanent in a creosotebush association. Area: 94 square meters.

EPCM 31:106:2:31 (Keystone Dam Site #1) (UTM Zone 13:351650E, 3522400N)

Two hearths of fire-cracked rocks, one ca. 3 m x 2 m and one ca. 3 m x 1.5 m in size, six El Paso Brown sherds, and one uniface chopper of white sandstone found scattered over an area 33 m x 18 m in size on the alluvium at the mouth of an arroyo in a creosotebush-mesquite plant association. Area: 594 square meters.

EPCM 31:106:2:32 (Keystone Dam Site #2) (UTM Zone 13:352050E, 3522050N)

Two hearths of fire-cracked rocks, ca. 3 m in diameter each, two quartzite hammerstones, one of which is also a unifacial chopper, a uniface chopper on a large rhyolite flake, one chert chopper, two scrapers, one of rhyolite and one of chert, one chert scraper-graver, three chert and one rhyolite cores, 31 debitage flakes, and one metate fragment of quartzite scattered over an area 145 m x 100 m in size on a sandy terrace in a creosotebush, soaptree yucca, and mesquite plant association. Area: 14,500 square meters.

EPCM 31:106:2:33 (Keystone Dam Site #4) (UTM Zone 13:352200E to 352450E, 3521400N to 3521700N)

Nine hearths of fire-cracked rocks range in size from 6 m x 2 m up to 17 m x 4 m as exposed, ca. 22 El Paso Brown

sherds, including four direct rim sherds, from vessels of simple shape, one Alma Plain sherd, a limestone chopper, a fragment of an obsidian projectile point, a banded chert biface (a point blank?), a yellow jasper biface fragment, a number of used and debitage flakes, one uniface mano, one andesite pestle, and a flat-bottomed, charcoal-filled pit that may be a pithouse were found over an area 344 m x 260 m in size that is located on a low sandy alluvial deposit at the mouth of an arroyo. The plant community is characterized by creosotebush, four-winged saltbush, mesquite, and soaptree yucca. Area: ca. 40,000 square meters (4 hectares).

EPCM 31:106:2:34 (Keystone Dam Site #5) (UTM Zone 13:352500E, 3521500N)

Two hearths are partially exposed, two El Paso Brown sherds, and one uniface mano were found distributed over an area 140 m x 52 m in size on a low sand and gravel terrace beside the mouth of an arroyo. The site is covered with creosotebush, mesquite, and soaptree yucca. Area: 4,264 square meters. This site is probably an extension of Keystone #4 (EPCM 31:106:2:33) but the intervening arroyo and recent road-grading operations have destroyed surface evidence of contiguity, and the more than 50 m spatial separation requires a separate designation according to the definition utilized here.

EPCM 31:106:2:35 (Highway Diversion Site #1) (UTM Zone 13: 353300E, 3521200N)

One hearth of fire-cracked rock, 6 m x 2 m in size, without associated artifacts was found on a sandy terrace in a creosotebush, soaptree yucca, acacia or mimosa, mesquite, and

mormon tea plant association. Area: 12 square meters. This hearth will probably not be disturbed by construction.

EPCM 31:106:2:36 (Highway Diversion Site #2) (UTM Zone 13: 353200E, 3521150N)

One hearth of fire-cracked rock, 6 m in diameter, without artifacts was found on a sandy terrace in a creosotebush, soaptree yucca, accacia or mimosa, mesquite and mormon tea plant association. Area: 19 square meters. No evidence of human activity was found between this site and EPCM 31:106:2:35 which is some 55 meters to the southwest.

EPCM 31:106:2:37 (Highway Diversion Site #3) (UTM Zone 13: 352650E, 3521800N)

One hearth of fire-cracked rock, 5 m x 2 m in size, without associated artifacts was found on a sandy terrace in a creosotebush, soaptree yucca, mesquite and mormon tea plant association. Area: 10 square meters.

Relation of Site Location to Natural Environment

Two general classes of sites were found in this survey according to the nature of the archeological remains, those having ceramics on them and probably relating to the Mesilla Phase, and those lacking ceramics and possibly relating to the Archaic period. The sample is far too small for a statistical evaluation of significance but there is a correlation between these site characteristics and the natural environment in which they are found that may be worthy of further consideration when more extensive surveys are made.

All of the non-ceramic sites are located on upland or older terrace locations and none of the ceramic sites are in those locations. All three of the latter sites are located on the alluvium at the mouths of arroyos and within 10 to 15 feet of the present river level. From this limited sample it appears that the Mesilla Phase sites were not located on upland or older terrace areas but there is no assurance that the non-ceramic sites were not located at the arroyo mouths also and have since been covered by alluvium. The sparseness of artifacts on the sites away from the river suggests that those localities were relatively unproductive of resources important to the aboriginal inhabitants.

Significance of the Archeological Resources

Each of the eighteen sites identified as a result of this survey provides some information about the prehistoric social groups that once existed in the area. The significance of that information is determined by the theoretical framework in which it is placed and by the ingenuity of the scientist interpreting it.

As a means of identifying, organizing, and evaluating these data relative to human behavior a theoretical perspective is employed wherein a localized group of humans is viewed as a subsystem of the ecosystem which is composed of: 1) living individuals, each with capabilities and limitations; 2) tools, facilities, and other items of technology that complement the human body; 3) an organization of the social group whereby individual behavior is coordinated with that of others for the benefit of the individual and/or group; 4) the ideology of the group which includes the cognizant and unwitting knowledge necessary to keep the system in operation. The overall purpose of such a social system is to perpetuate the biological component through the satisfaction of the minimal needs for group survival which include, but are not limited to, food, water, shelter, rest, protection, sex outlet, child care, and individual recognition. The satisfaction of these eight basic needs occupies virtually all of the time available to participants in simple societies such as are believed to have existed in the El Paso area in the prehistoric period. Of these needs, those that must be resupplied most frequently are food, water, and

rest, and the latter two may usually be satisfied in the same localities repeatedly while food procurement activities will probably be widely dispersed because of the dispersed nature of the food resources. Therefore, we may expect that most of the evidence of human activities discovered in surveys such as the one reported here will relate to food acquisition and preparation. Water was probably available perennially along the river and scarce elsewhere most of the year, a condition that may have held the population within an easy walk of that vital necessity.

If the archeological remains reported herein are evaluated primarily in terms of their relationship to food acquisition and preparation, several questions may be investigated through the examination of these sites: 1) What food stuff was being acquired and/or prepared? 2) What items of technology were required? 3) Was the resource exploited seasonally or perennially? 4) Was the resource exploited most efficiently by individuals or by groups of cooperating individuals? 5) If group exploitation was practiced, what was the age-sex composition of the group? 6) Was the resource consumed by the exploiting group alone or was a surplus produced and shared with others? 7) If there was a surplus, was it stored for future use? 8) If group exploitation was practiced, was the exploiting group a segment of a larger coresidence group? 9) What nutritional requirements (amino acids, vitamins, minerals, fats, carbohydrates, etc.) were satisfied by each food resource?

Several of these questions must be pursued through the study of sites that are approximately contemporaneous, and the

establishment of contemporaneity may be accomplished by a number of absolute and relative dating techniques, including radiocarbon dating, archeomagnetic dating, the construction of pollen profiles, etc. This problem of time placement and that of the reconstruction of the floral and faunal components of the ecosystem may also be investigated through the examination of archeological sites such as those listed here.

The sites on which a greater number of activities were pursued by the aborigines may provide important additional information also, such as evidence relating to the physical type of the occupants should burials be found, and data relative to their mode of satisfying the basic needs other than that for food, including: 1) the types of shelters constructed; 2) whether or not defensive or offensive activities are indicated; 3) whether males or females, or both, were brought into the group in marriage; and 4) the types of symbols that might have been used to designate individuals of different status, etc. The answers to these and other questions are important to the understanding of the adaptive strategies pursued by the occupants of this area and, therefore, constitute important bases for evaluating the information potential of these sites.

The archeological sites reported above probably relate to two prehistoric time periods, a preceramic Archaic period and the early ceramic Mesilla Phase. The Archaic period is poorly represented in the El Paso area. The density of population is unknown, and even the nature of the economic base is undocumented although it is assumed, on the basis of extrapolation from adjacent areas of New Mexico, to have been that

of hunting and foraging.

Mesilla Phase sites have, until recently, rarely been identified in the El Paso area and have been assumed to be manifestations of a small population of low density. The numerous sites of this phase recently observed in the Hueco Bolson on the east side of the Franklin Mountains (Lynn, Baskin, and Hudson 1975; Whalen in press) raises the possibility that the population density may have been considerably greater than previously assumed, although the long time period--750 or 850 A.D. to 1100 A.D.--presently attributed to the phase permits the alternative suggestion that the numerous sites merely represent repeated occupations of favored localities by a sparse population over a long period of time. The only sites of this phase to have been tested in the immediate vicinity of El Paso are the Northgate Site (Aten 1972;Gerald 1972) and EPCM 31:106:4:132 (Whalen in press) where insufficient work was accomplished to permit more than a guess as to the adaptive strategies employed by the occupants.

The presence of dwellings at both of those sites and of burials at the former site does suggest a relatively permanent occupation which was probably based partially on horticulture, and evidence of domesticated plants has been recovered from EPCM 31:106:4:132 (Whalen personal communications). Further information on the subsistence pattern of Mesilla Phase villagers living along the Rio Grande ecotone would provide a valuable supplement to that obtained from the Hueco Bolson.

The early date attributed to the Northgate Site on the basis of two radiocarbon dates--730±130 and 750±70 A.D. (Aten 1972:13)--raises the possibility that the Mesilla Phase is of much longer duration than previously suspected. On the other hand it is also possible that the manifestation of human occupation at that site or those in the present study area may represent adaptations sufficiently distinct from the Mesilla Phase, as described by Lehmer (1948), to justify new designations. At least it would be useful to distinguish smaller time divisions so that population estimates could be figured more accurately on the basis of the number and size of sites of each time division.

Another important type of information that is probably recoverable from the sites reported in this survey is that relating to the environmental history of the area during and since the occupation of the sites. Climatic conditions are basic determinants of plant and animal densities and this latter information must be available before the relative importance of these exploitable resources can be estimated, and the latter must be known before the exploitative activities and tools can be determined or the size of the exploiting group estimated.

Among the immediately practical applications of the scientific findings that will be acquired from the information probably available in the sites reported herein, should they be excavated, is the very important one of a better approximation of the range in climatic conditions in the El Paso area over a larger portion of the post-glacial period.

This information becomes more important to local city planners and those concerned with flood protection when it is realized that at present the only long-range study of climatic change in the west that includes the El Paso area indicates that during recent decades the area has suffered the most severe and long enduring drought known since 1500 A.D. Or to put it another way, the El Paso area has been subjected to mild or severe drought conditions for about 140 of the 439 years between 1516 and 1955 A.D. and 80 years of the most severe and long lasting drought occurred between 1835 and 1955 (Fritts 1965). The climatic records upon which future climatic predictions are based by the Corps of Engineers and others concerned with long-range planning are derived largely from weather records collected during this drought period. A better knowledge of the average and range of climatic conditions in the El Paso area would be of great value to those concerned with the construction of protective earth works, storm drainage, dwelling and industrial site planning, etc., and additional information concerning past climate can be obtained during the excavation of some of the sites covered in this report.

Information on the strategies developed by societies in the past for coping with problems arising as a result of minimal food supplies in a semiarid environment will be useful to international planners facing the task of providing nutrients for the increasingly large numbers of mankind occupying arid and semiarid regions of the earth. It is expected that several of the sites located on the survey will provide new

information on the utilization of arid zone food resources that are not presently being exploited.

The monetary value of the archeological resources identified in the survey of the five local protection project dams and associated drainage and diversion channels in northwest El Paso has been calculated on the basis of the estimated cost of recovery of all material remains and associated information, and of analyzing that information and making it available to the American public in a publication.

The total cost of recovering all information and objects is estimated to be $184,627.34This is based on a 4.5 man crew working in the field for 367.3 working days (Table 1) with supporting laboratory crews and a period for report preparation. The ratio of field personnel per day to laboratory personnel per day to report preparation personnel per day is 1:1.2:2.5 This produces a cost of $1,471.31per field-crew-day. This estimate is based on the figures provided in Appendices A and B and must be regarded only as an estimate and not as a basis for contract negotiation.

Direct and Indirect Impact of the Proposed Constructions

All of the sites reported above, except EPCM 31:106:2:35, are within the areas of the proposed construction, in the flood pool area behind the dams, or are close enough to the construction sites to be endangered by the movement of heavy equipment during the construction. None of these sites could survive the destructive effects of the proposed constructions or of the movement of heavy equipment but some sites are on terrace remanents in the flood pool areas where they face little danger from the construction activities unless the locality is designated as a borrow area. The effects of occasional flooding on archeological resources is unknown and therefore must be assumed to be detrimental.

The types of impact to which these sites will be exposed is as follows:

EPCM 31:106:2:20	Possibly subjected to disturbance by equipment movement
EPCM 31:106:2:21, EPCM 31:106:2:22, EPCM 31:106:2:23, EPCM 31:106:2:24	Possibly subjected to flooding
EPCM 31:106:2:25, EPCM 31:106:2:26, EPCM 31:106:2:27	Subjected to disturbance by equipment movement
EPCM 31:106:2:28, EPCM 31:106:2:29	Subjected to flooding
EPCM 31:106:2:30, EPCM 31:106:2:31	Subjected to destruction by construction activities
EPCM 31:106:2:32	Subjected to flooding
EPCM 31:106:2:33	Subjected to destruction by construction and equipment movement

EPCM 31:106:2:34 Subjected to destruction by construction activities

EPCM 31:106:2:35 Probably outside the area of equipment movement and will not be affected by the proposed activities directly

EPCM 31:106:2:36, EPCM 31:106:2:37 Subjected to destruction as a result of equipment movement

Three of the sites to be suggested as eligible for nomination to the National Registry of Historic Places, EPCM 31:106:2:31, :33, and :34, will be impacted directly by the construction or by the movement of heavy equipment. Four of the other elgible sites may be subjected to flooding.

The principal indirect impact the proposed actions will haye upon the remaining sites will be that resulting from the greater facility with which the localities can be reached by persons from the adjacent city as a result of the improvement of the roads giving access to the construction sites.

Recommendations on Sites Eligible for Nomination to the National Registry of Historic Places

It is suggested that eight sites, EPCM 31:106:2:29, :31, :32, :33, :34, :35, :36, and :37, are eligible for nomination to the National Registry of Historic Places. These sites are the ones that appear to have some potential for providing information relative to the questions posed above. The potential these sites hold for providing information pertaining to the human social system ranges from the relatively great potential at EPCM 31:106:2:33 where several hearths and a possible pithouse as well as numerous artifacts arevisible in eroded areas to the lesser potential of the one hearth sites where few or no artifacts are notable on the surface but datable charcoal and/or identifiable plant remains are presumed to exist below the surface.

Under the traditional culture center-age area descriptive paradigm that has prevailed in archeology it has been the practice to value highly only those sites bearing evidence of dense single component or multiple component occupations. Under the social systems paradigm adopted here all sites are considered to be of value, if it seems probable that they hold usable information relative to the adaptive strategies employed by prehistoric peoples. The sparse lithic scatters reported above undoubtedly contain useful data but it seems unlikely that theoretical propositions of the degree of finesse required can be developed before more information relating to the general adaptive strategies has been obtained, and the expenditure of the limited funds available on the amassing of more descriptions based upon covert intuition rather than upon overt theories of adaptation seems

unwarranted. In ephemeral activity areas of the types represented by these nondescript lithic scatters much of the data usable in reconstructing prehistoric adaptation patterns must be recorded in the field rather than in the archive or the museum warehouse, therefore, these sites are not considered eligible for nomination.

It is suggested that two sites, EPCM 31:106:2:33 and :34, are elgible for nomination to the National Registry of Historic Places because of the concentration of evidence observed on them. As noted above these sites are located in a sanddune environment at the edge of the flood plain of the Rio Grande and are separated by some 55 meters of space at present but may once have formed parts of one contiguous site that has since been cut by an arroyo and by a city sewer line and superimposed roadway. Both areas have similar surface manifestations in the form of chipped stone, ground stone, brownware sherds, and hearths, although one site, EPCM 31:106:2:33, is considerably larger than the other and manifests in an arroyo cut, a charcoal filled, flat-bottomed pit that may be the remains of a dwelling built in a shallow pit. These attributes are characteristic of the Mesilla Phase (Lehmer 1948) which is believed to date from about 750 A.D. to about 1100 A.D. A recently received series of radiocarbon dates from a pithouse of this phase in the Hueco Bolson suggest that this cluster of attributes may date even earlier (Tucek, personal communications), thus bringing the initiation of the Formative period in the El Paso area into closer alignment with the dates of similar assemblages from somewhat farther west. Since charcoal has been observed in the arroyo cut pit it is entirely possible that site EPCM 31:106:2:33 will provide additional information relative to the dating of the Mesilla Phase and to the adaptive strategies

employed by occupants of riverine sites of this time period. While it is assumed that site EPCM 31:106:2:34 is a continuation of site EPCM 31:106:2:33 it cannot be assumed that duplicated data are to be found on both because no information is available on the distribution of activity areas or on the estimated number of dwellings in sites of this phase, therefore, it is suggested that both be placed on the Registry so that the complete occupation may be preserved for future investigation.

There has been no previous archeological examination of these sites and only one small, shallow pothunter pit was observed and it apparently did no damage and is not recent.

A third site, EPCM 31:106:2:31, recommended as eligible for nomination to the National Registry of Historic Places, is also located at the mouth of an arroyo a short distance north of EPCM 31:106:33 and :34. Because of its proximity--ca. 0.9 km--to the latter sites absolute contemporaneity is unlikely, therefore, it is hoped that evidence will be recoverable at these sites from which the long-enduring Mesilla Phase can be subdivided. The arroyo that passes through this site may have eroded part of the site but it seems more likely that it has merely covered a portion of the site with a thin layer of alluvium.

The large aceramic site, EPCM 31:106:2:32, is recommended as eligible for nomination to the National Registry because of the relatively high density of artifacts observed on the surface and the two fire-cracked stone hearths. If this site is preceramic as seems probable, it should provide information on the Archaic Period from which the adaptive strategies of that period can be distinguished from those of the Mesilla Phase. This site may also

provide information from which it will be possible to develop an understanding of some of the smaller one-hearth aceramic sites.

The last four sites recommended as eligible for nomination to the National Register, EPCM 31:106:2:29,:35,:36, and :37, are each manifested as hearths of fire-cracked rocks where little or no other evidence of human activity was noted in the survey. It is believed that useful information in the form of radiocarbon dates and plant remains can be recovered from the charred materials recoverable by flotation from these features. This will provide dates and a list of species used for firewood and possibly of the species of plants and/or animals cooked in the hearths. Also, artifacts may be recovered as may pollen from the latter of which environmental profiles can be reconstructed. Because of the sparsity of fire-cracked rock hearths in the survey area and generally on the west side of the Franklin Mountains it is suggested that maximal attention be devoted to these poorly understood manifestations of prehistoric adaptive strategies.

Recommendations to Mitigate Losses

Four possible responses to the expected loss of the archeological resources described above are envisioned. These are: 1) Construction of the projects without attempting to mitigate the losses of resources; 2) Alteration of the location of the planned projects to avoid the resources; 3) Recovery of all archeological resource information and objects before proceeding with the projects; 4) Recovery of a sample of the resources that is sufficient to provide an understanding of the adaptation employed by the prehistoric people to perpetuate their social system.

Of these four suggested responses, the first, to proceed with the project without attempting to mitigate the losses, results in the waste of valuable national resources and is not permitted by law. The second suggested response, to change the location of the project, is probably possible but may be the more expensive alternative for all of the planned projects in this study except the Keystone Dam project. The presence of two sites that are recommended as elgible for nomination to the National Registry of Historical Places along the centerline of this dam and the estimated cost of mitigating the loss of those resources along ($176,536) makes it desirable to find an alternative location for the project, if possible. The third suggested response, the complete excavation of the archeological resources, is an extremely expensive undertaking because of the large amounts of skilled hand labor necessary to recover all of the resources recoverable with present techniques. Moreover, there is a point in the amassing of data at which redundancy greatly reduces the

value of additional information. From this perspective, the forth suggested response, the recovery of a sample of the resources, is the more desirable of the latter two alternatives in so far as it permits the acquisition of data sufficient to answer the questions posed under the theoretical framework developed above and still does not require the excavation, cataloging, reporting, and storing of a great amount of redundant objects and information.

Several of the sites recorded as a result of this survey appear potentially capable of providing more than the minimal amount of information bearing on prehistoric adaptive strategies. It is recommended that these sites be tested or subjected to relatively thorough sampling through excavation. The specific sites and the number of 4.5-man crew days that it is suggested be expended on each is given below (Table 2). It should be kept in mind that every man-day in the field requires about four man-days in laboratory, writing, and administrative time.

TABLE 2

Recommended Mitigation Time

Site Number	Field Crew Days	Site Number	Field Crew Days
EPCM 31:106:2:29	0.5	EPCM 31:106:2:34	20.0
EPCM 31:106:2:31	2.0	EPCM 31:106:2:36	0.5
EPCM 31:106:2:32	2.0	EPCM 31:106:2:37	0.5
EPCM 31:106:2:33	100.0		

The time recommended for the excavation of each of the one-hearth sites (EPCM 31:106:2:29, 36, 37) is sufficient for a trained

crew to excavate a cross-section, collect any artifacts that may be encountered, collect charcoal for floral identification and radiocarbon dating, estimate the number of fire-cracked rocks and measure their size and density, and record all observations.

The time recommended for the excavation of sites EPCM 31:106:2:31 and 32 should be sufficient to collect all surface artifacts with spatial control, to test all hearths, and to test any areas that appear upon more intensive study to have subsurface features.

The time recommended for the excavation of sites EPCM 31:106:2:33 and 34 is believed adequate to permit the systematic sampling of approximately one-third of each of the sites through the employment of a backhoe for the rapid excavation of the selected trenches and hand excavation crews to expose any subsurface remains discovered. The one-third sample will probably be the maximum realized because it is expected that it will prove to be too expensive to remove some of the larger sand dunes on the two sites so that the old surface below them can be tested and because no time is budgeted for the excavation of burials or other resources requiring unusual care in excavation and/or field preservation.

On the basis of surface and arroyo exposures it is expected that these two contemporaneous and probably once contiguous sites will provide, among other things, information relative to the village size, the distribution and orientation of dwellings, the size and style of dwellings and the nature of the domestic utensils utilized in them, the number and nature of outside activity

areas, the number of burials, and the age, sex, and other physical characteristics of the inhabitants. It may be confidently expected that data of importance to the elucidation of other problems discussed in the section on significance will be recovered during the course of the excavation search also.

It is believed that these two larger sites recommended for mitigation action will provide valuable new information on early Mesilla Phase villages and that some of the small nonceramic sites may pertain to the Archaic Period and may provide additional information on this poorly known time horizon.

The estimated cost of mitigating the loss of information contained in the seven sites listed above is based upon the assumption that a bona fida attempt will be made to recover information on the nature of the social systems that once occupied the sites in question and on the adaptive strategies employed by the participants in those social systems as outlined in the discussion is this section and in the section on significance. More details on the estimation of costs are given in Appendix B where the costs of mitigating the loss of resources in sites EPCM 31:106:2:33 and 34 are calculated. That total figure, for a 60-day field period, is utilized as a basis for estimating the 4.5-man field-crew-day cost of processing data from excavation to finished report. This procedure produces an estimated cost of $1,471.13 per field-crew-day and a total cost of $184,627.34 to mitigate the loss of information contained in the seven sites lying within the project. An eighth site, EPCM 31:106:2:35, is believed to lie outside the area to be disturbed by the project, but should it be endangered an additional 0.5 field-crew-day or $735.57 should be allocated.

Summary

Eighteen archeological sites, all prehistoric, are reported in or near areas to be distrubed by the construction of five dams and associated drainage and diversion ditches in the local protection project in northwest El Paso. Most of these sites are small lithic scatters, eight have one or more hearths on them, and three have brownware ceramics. Three of the ceramic and five aceramic sites appear to have subsurface deposits which, together with the surface manifestations, are believed to contain resources sufficiently important as to make them eligible for nomination to the National Registry of Historic Places.

Should it be impossible to avoid the destruction of the sites containing hearths and associated characteristics it is recommended that the losses of the archeological resources be mitigated through excavation. The six smaller hearth sites will require relatively little excavation time compared to that recommended for the two larger sites, if representative samples are to be obtained. It is estimated that a total of $184,627.34 will be needed to adequately examine the more promising of the sites--those recommended as eligible for nomination to the National Registry--and to recover enough information to mitigate their loss. A budget to mitigate the loss of these archeological resources through excavation is summarized in Appendix A and detailed for the larger two sites in Appendix B.

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APPENDIX A

Summary of a Budget for the Mitigation of Losses of Archeological Resources to be Destroyed as a Result of the Construction of Five Dams and Associated Drainage and Diversion Channels in Northwest El Paso, Texas

I. Estimated Cost of Excavating EPCM 31:106:2:33 and 34

A. Direct Costs		
1. Salaries and Wages	$ 87,080.19	
2. Insurance and Taxes (8.5% x A1)	7,401.82	
3. Per diem ($10/man/field day)	5,400.00	
4. Specialists	6,800.00	
5. Equipment Rental	13,875.00	
6. Equipment Purchase	450.00	
7. Expendables	4,635.00	
8. Publication (est. 300pp x $10/p)	3,000.00	
Total Direct Costs	128,642.01	
B. Indirect Costs (55% x A1)	47,894.10	
C. Total Cost of Excavating EPCM 31:106: 2:33 and 34		$176,536.11
D. Excavation costs per 4.5-man field-crew-day		1,471.13

II. Total Cost of Mitigating Losses of Archeological Resources at Seven Sites (125.5 field-crew-days x $1,471.13/day) $184,627.34

APPENDIX B

Budget for the Mitigation of Losses of Archeological Resources at Sites EPCM 31:106:2:33 and 34 as a Result of the Construction of the Keystone Dam and Associated Outflow Channel in Northwest El Paso, Texas

	Men/ Field Day	Hrly Rate	Daily Rate	Cost/ Field Day	Project Cost
I. Direct Costs					
A. Salaries & Wages/Field Day					
1. Field Crews (2)					
a. Project Archeo.	0.5	7.64	61.12	30.56	
b. Archeo.Supervisor I	2.0	4.06	32.48	64.96	
c. Archeo.Assistant III	6.0	3.55	28.40	170.40	
d. Photographer	0.5	3.55	28.40	14.20	
Subtotal				280.12	
2. Laboratory Crew					
a. Project Archeo.	0.5	7.64	61.12	30.56	
b. Lab. Supervisor	1.0	4.49	35.92	35.92	
c. Archeo.Assistant I	4.0	2.54	20.32	81.28	
d. Lithics Analyst	1.0	3.55	28.40	28.40	
e. Faunal Analyst	0.5	3.55	28.40	14.20	
f. Macrofloral Analyst	2.0	3.55	28.40	56.80	
g. Photographer	0.5	3.55	28.40	14.20	
h. Keypunch Operator	0.25	2.54	20.32	5.08	
i. Typist	1.0	2.54	20.32	20.32	
Subtotal				286.76	
3. Report Preparation Crew					
a. Project Archeo.	5.0	7.64	61.12	305.60	
b. Lab. Supervisor	5.0	4.49	35.92	179.60	
c. Draftsman	1.0	3.55	28.40	28.40	

	Men/ Field Day	Hrly Rate	Daily Rate	Cost/ Field Day	Project Cost
I.A.3. Report Preparation Crew					
d. Typist	3.0	2.63	21.04	63.12	
Subtotal				576.72	
4. Administrative Personnel					
a. Bookkeeper	2.0	4.49	35.92	71.84	
b. Typist	6.0	2.71	21.68	130.08	
Subtotal				201.92	
Total Salaries & Wages/Field Day				$ 1,345.52	
Total Salaries & Wages/60 Field Days				$80,731.20	

	No. Men	Hrly Rate	No. Mos	Acrl Rate Hrs/ Mo.	Line Totals	Project Cost
5. Vacation (Min. 6Mos)						
a. Project Archeo.	1	7.64	18	7	962.64	
b. Lab. Supervisor	1	4.49	18	7	565.74	
c. Bookkeeper	1	4.49	6	7	188.58	
d. Typist	1	2.71	18	7	341.46	
e. Typist	1	2.63	9	7	165.69	
Subtotal					2,224.11	
6. Sick Leave						
a. Project Archeo.	1	7.64	18	8	1,100.16	
b. Lab. Supervisor	1	4.49	18	8	646.56	
c. Bookkeeper	1	4.49	6	8	215.15	
d. Typist	1	2.71	18	8	390.24	
e. Typist	1	2.63	9	8	189.36	
f. Field Crew Leaders	2	4.06	3	8	194.88	

	No. Men	Hrly Rate	No. Mos	Actl Rate Hrs/ Mo.	Line Totals	Project Cost
I.A.6. Sick Leave (cont.)						
g. Field Crew Men	6	3.55	3	8	511.20	
h. Photographer	1	3.55	3	8	85.20	
i. Lithic Analyst	1	3.55	3	8	85.20	
j. Faunal Analyst	1	3.55	3	8	85.20	
k. Macrofloral Analyst	2	3.55	3	8	170.40	
l. Draftsman	1	3.55	3	8	85.20	
m. Catalogers	4	2.54	3	8	243.84	
n. Keypunch Operator	1	2.54	3	8	60.96	
o. Typist	1	2.54	3	8	60.96	
Subtotal					4,124.88	
Total Salaries-Wages-Leave Time						$87,080.19
B. Insurance and Taxes (8.5% x IA)						7,401.82
C. Per Diem ($10/man x field days)($10 x 9 x 60)						5,400.00
D. Specialists						
1. Petrographer					200.00	
2. Palynologist ($30/sample x 100)					3,000.00	
3. Archeomagnetism ($125/sample x 10)					1,250.00	
4. Sedimentary Geologist					300.00	
5. Statistician					300.00	
6. Radiocarbon Dates (10 x $175 ea.)					1,750.00	
Subtotal						6,800.00
E. Equipment Rental						
1. Vehicles (2 x $70/wk x 12 wks)					1,680.00	
2. Mileage (2 x 15¢/mi x 25mpd x 60 da)					450.00	
3. Frontend loader ($128/da x 40 da)					5,120.00	

	Line Totals	Project Cost
I.E. Equipment Rental (cont.)		
4. Computer	300.00	
5. Small Frontend Loader ($200/wk x 10 wks)	2,000.00	
6. Dumptruck ($64/day x 50 days)	3,200.00	
7. Field Toilets (2 x $25/wk x 12 wks)	600.00	
8. Field Office-tool shed ($175/mo x 3mos)	525.00	
Subtotal		13,875.00
F. Equipment Purchase		
1. Aerial photos on mylar	100.00	
2. Mechanized screens (2 x $50 ea.) Small	100.00	
3. Large Mechanized screen	100.00	
4. Photographic ladder (25' al. extension)	150.00	
Subtotal		450.00
G. Expendable Supplies		
1. Diazo prints of aerial mylars	35.00	
2. Field supplies and replacement equip. ($10/crew/day)(2 x $10 x 60)	1,200.00	
3. Cataloging and preservation supplies ($10/crew/day)(2 x $10 x 60)	1,200.00	
4. Analysis lab expendables ($10/crew/day)(2 x $10 x 60)	1,200.00	
5. Report preparation expendables ($5/crew/day)(2 x $5 x 60)	600.00	
6. Gasoline		
a. Vehicles (3,000 mi ÷ 15 mpg x 50¢)	100.00	
b. Small front end loader (10 g/da x 60 days x 50¢/g)	300.00	
Subtotal		4,635.00

	Line Totals	Project Cost
I.H. Publication (est. 300 pp x $10/p)		3,000.00
Total Direct Cost		128,642.01
II. Indirect Cost (U.T.E.P. figures)(55% x IA)		47,894.10
Total Project Costs		$176,536.11

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