AN ARCHAEOLOGICAL SURVEY AND ASSESSMENT OF GRAN QUIVIRA NATIONAL MONUMENT, NEW MEXICO

by

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Performed under National Park Service Contract No. PX7029-0-0697

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CHAPTER ONE

INTRODUCTION

INTRODUCTION

The following report summarizes information gathered from the archaeological survey performed at Gran Quivira National Monument by New Mexico State University (NMSU) under Order No. PX7029-0-0697. The actual survey was done by the author and Michael Taylor during the fall of 1980 and the spring of 1981. A total of 23 new sites, along with 859 isolated occurrences, were recorded during the course of the survey. The site forms, maps, field notes, air photographs, and photographs generated by the work are not part of this report as these items have previously been submitted to the National Park Service (NPS).

The Gran Quivira National Monument was established in 1909 by presidential proclamation, signed by William H. Taft. At that time, it totaled approximately 160 acres. In 1919, President Woodrow Wilson issued a proclamation adding about 400 acres to the Monument. These 560 acres comprised the entire Monument area until 1959 when a land exchange program took place, adding about 50 acres and bringing the Gran Quivira Monument to its present size of 610 acres.

On December 19, 1980, President Jimmy Carter signed Public Law 96-550, which changed the name of Gran Quivira National Monument to Salinas National Monument. The law also authorized the Secretary of the Interior to add 466 acres of land to the Monument, so as to include the state monuments Abo and Quarai. Thus, Gran Quivira, Abo and Quarai became officially the Salinas National Monument.

In many respects, this concept was a very appropriate one. It is virtually impossible to deal with the "Pueblo de las Humanas" (Gran Quivira) without considering the other large pueblos in the immediate region. The transfer of Abo and Quarai from the State of New Mexico to the NPS places three important ruins of the region under the protection of one agency and will hopefully result in a more viable regional concept for the visitor to these important monuments.

The contract called for an archaeological survey of all cultural resources within Gran Quivira National Monument. A 100 percent survey can be defined in a number of ways (e.g. Bureau of Land Management [BLM] requires archaeologists walking transects not more than 30 meters apart). But, no matter how close the transects, no survey ever records 100 percent of the archaeological information present. This problem is due to the presence of subsurface materials and structures and variation in angle of lighting, vegetation

cover, observation skills of the observer, transect distance, etc. The actual survey was conducted by walking parallel transects 7-10 meters apart. By utilizing this close interval, it was felt that it would be hard to miss any concentrations of cultural material or sites.

The survey did locate a number of probable pithouse villages. Although pithouses were known to exist on the Monument, it now appears that the Monument area had a great number of pithouses present. These, coupled with a sizable pithouse village on Jack Kite's nearby property, indicate that this area had a large population even before the blue-gray limestone pueblos were built.

Three definite dams and their catchment basins were recorded during the survey. Historically, water was a problem at Gran Quivira. There is no reason to believe that this was not always the case even before the advent of the Spaniards, although with the advent of the Mission System and its associated livestock, water problems increased as the mission herds multiplied. The importance of water is evident in Father Feitas' description of 32 wells within a quarter of a league of the pueblo (Hackett 1937:162), and the number of dams and catchment basins built and utilized in adjacent monument areas.

Two late homestead sites were identified on the Monument, one in the extreme northeast portion of the Monument and the other in the extreme northwest part of the Monument. Both probably were initially occupied before the 1930's.

This survey raised a number of questions that still cannot be answered. Site GQ-20, a dugout area with a large pile of rock debris and a fair sherd scatter remains a mystery to the author. Sites GQ-5 and GQ-6 are on low lying alluvial fans and have large areas of sherd scatters, their ceramics span time from Jornada wares through at least Glaze V.

CHAPTER TWO

PHYSIOGRAPHY

PHYSIOGRAPHY

LOCATION AND LOCAL GEOMORPHOLOGY

The 610-acre Gran Quivira National Monument lies on the boundary line of Socorro and Torrance counties (Figure 1). This line is also the base line between the north and south townships for the State of New Mexico. The Monument's latitude is 34 degrees, 16 minutes north, and the longitude is 106 degress, 5 minutes west. The legal descriptions of the land within the Monument are as follows:

S 1/2 of S 1/2, Sec. 34, T1N, R8E, NMPM
S 1/2 of SW 1/4, Sec. 35, T1N, R8E, NMPM
N 1/2 of NW 1/4, Sec. 2, T1S, R8E, NMPM
N 1/2 of N 1/2, Sec. 3, T1S, R8E, NMPM
N 1/2 of NE 1/4, Sec. 4, T1S, R8E, NMPM

The ruins themselves are situated on a narrow, east-west oriented ridge of gray San Andres limestone (Figure 2). These limestone outcrops provided the main building material for the pueblos; later the same material was used for the construction of both churches. The natural bedding planes and fractures of the outcrop allowed the use of the limestone without any need for further shaping of the quarried material.

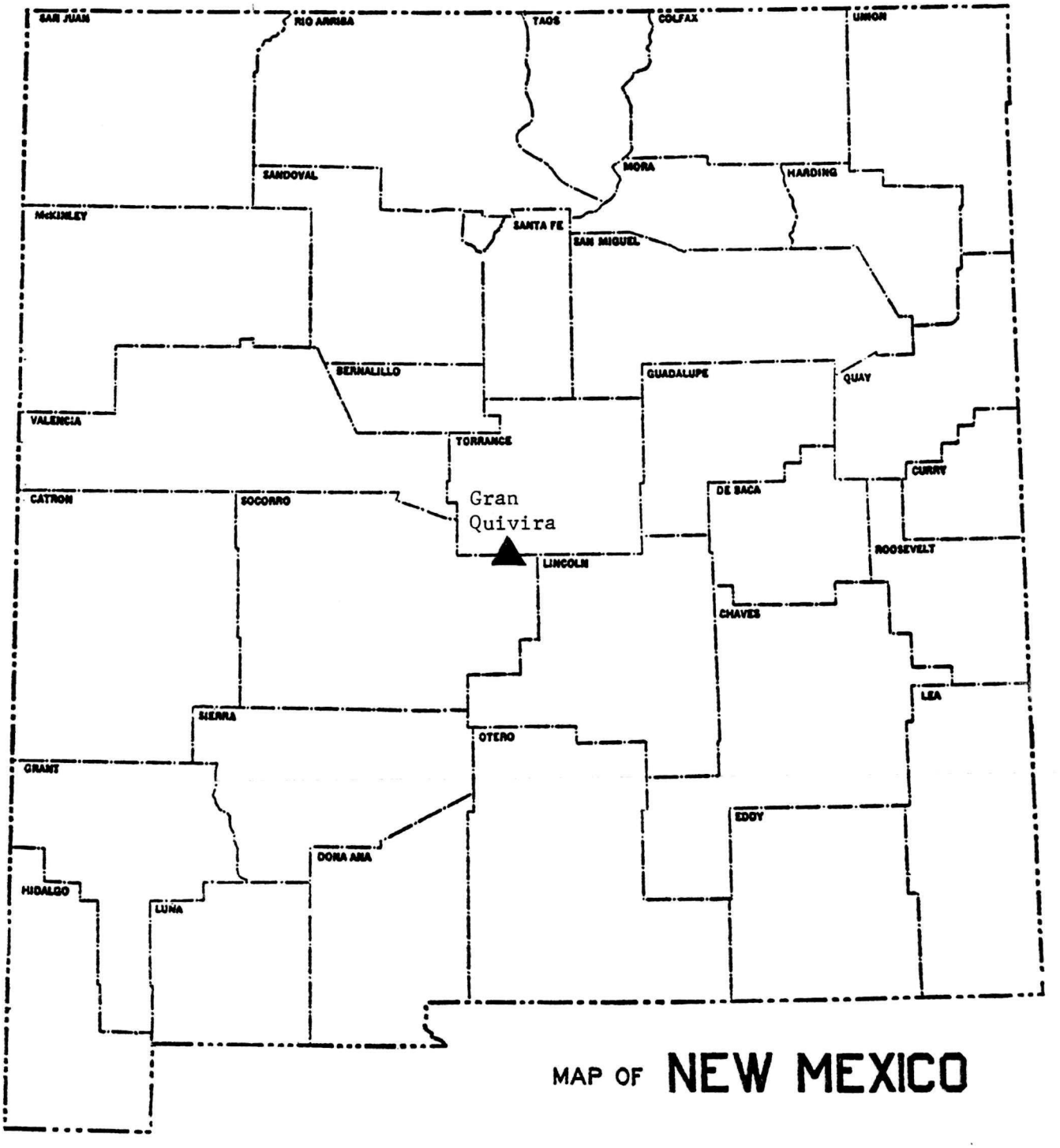


Figure 1: Project Area

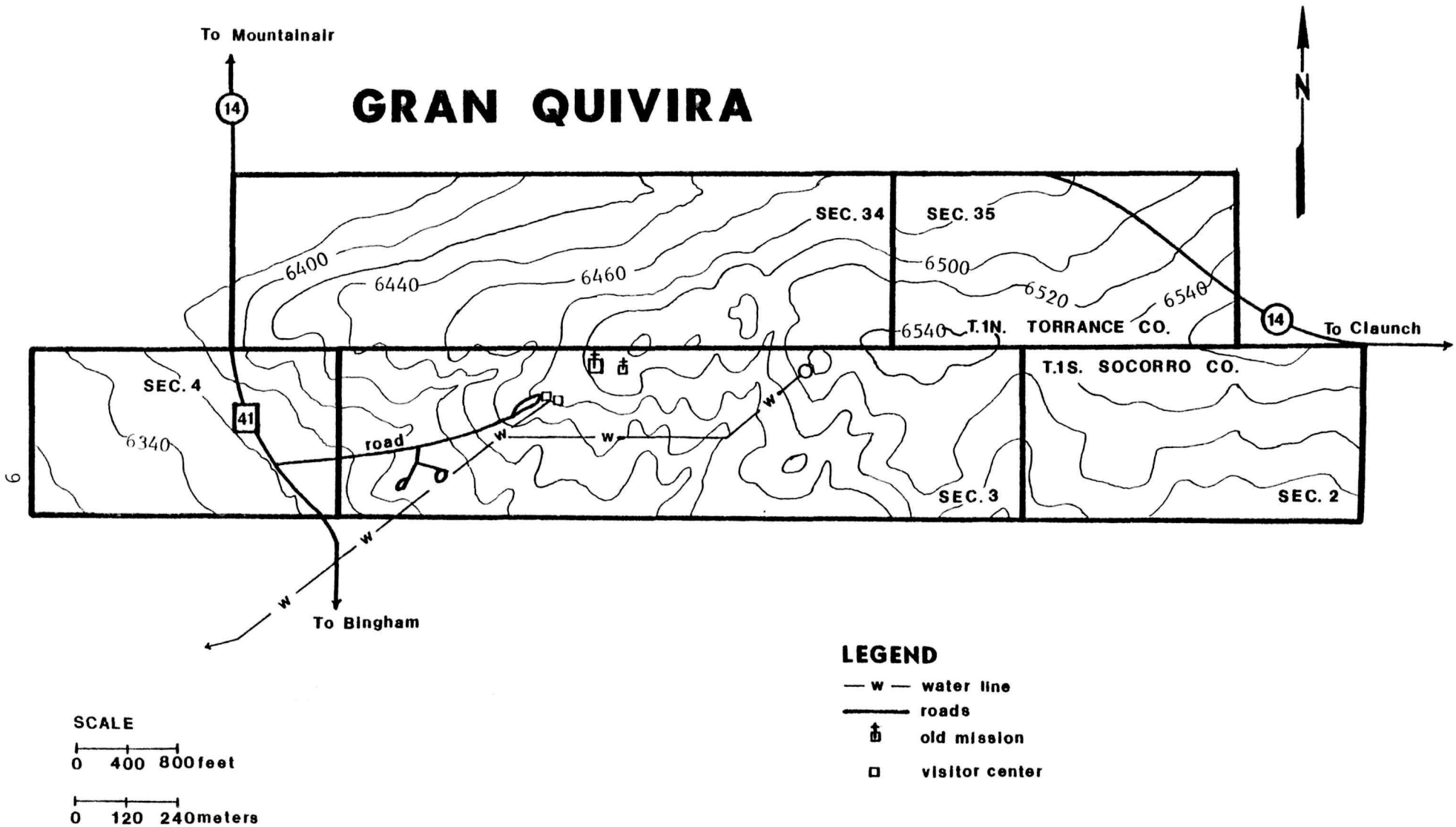


Figure 2: Contour Map.

The Monument is covered with intrusive Tertiary igneous/granite sills that reach the surface through the sedimentary San Andres formation laid down during the late Permian. The nature of the limestone in the local San Andres formation, coupled with the local closed basin evaporation and absorbtion, has produced a Karst topography with its associated depressions (sinkholes) throughout the region.

THE GEOLOGICAL SEQUENCE OF THE REGION

Bates, et al. (1947) states that 3,750 feet of sedimentary rocks are exposed above the pre-Cambrian basement complex. These sedimentary rocks are overlain by Quaternary deposits which are comprised of local sands and gravel, most are the result of the wearing down of the pre-Cambrian masses in the exposed mountain areas of the region.

The following (Table 1) lists in descending order the age of the various sediments in the area.

Table 1: Stratigraphy of the Region

Name	Age
Local sands and gravel	Quaternary
San Andres formation	Permian
Glorieta sandstone (upper Yeso)	Permian
Yeso formation	Permian
Abo formation	Permian?
Bursum formation	Permian?
Madera limestone	Pennsylvanian
Sandia formation	Pennsylvanian
Pre-Cambrian	Pre-Cambrian

San Andres Formation

The San Andres limestone at its type station is described by Needham and Bates (1943:1664-1666) and named by Lee (1909:12,29) for a locale in the San Andres Mountains in southern Socorro Country. According to Needham and Bates (1943:1664-1666), the San Andres formation at its type station is 593 feet thick. However, Bates et al. (1947:34) doubts if the formation is more than 200-300 feet thick in the Gran Quivira guadrangle.

The San Andres formation is comprised of limestone, sandstone and gypsum. The formation is suspectible to solution cavities and their resultant Karst topography. Surface exposures tend to weather to rough fretted surfaces. The San Andres formation is the one exposed throughout most of Gran Quivira.

Glorieta Sandstone

Keyes (1915:2,7) named the Glorieta sandstone formations. No type locality was given but it is probably derived from the sandstone found on Glorieta Mesa. In 1919, Hager and Robitaille assigned the Glorieta sandstone to the Permian Age.

The characteristics of the Glorieta is that of a yellow/white sandstone, moderately compacted with a high resistence to erosion. Bates et al. state "...at nine localities in the

quadrangle, the Glorieta ranges in thickness from 275 feet in the northern part to 150 feet in the southern part (Bates et al., 1947:33).

Yeso Formation

The type site for the Yeso formation is from the Mesa de Yeso, located 12 miles northeast of Socorro. The Yeso formation was named and described by Lee (1909:12) and redescribed by Needham and Bates (1943:1657-1661). Bates describes the lithology of the formation:

> ...the gypsums of the Yeso formation are white and gray and generally contain thin partings of shale and silt; the sandstones are mostly buff to orange-pink and are fine and silty; and the silts and shales are variegated (Bates 1947:31).

Abo Formation

In 1909 Lee (1909:12) named a series of dark-red sandstone in Abo Canyon the Abo formation. Later Needham and Bates (1943:1654-1657) described the type locality near the road that leads to the Abo Ruins. The Abo formation reaches a thickness of 914 feet at the type station, and is probably Permian in age although there is conflicting evidence for its age.

Bates describes the lithology of the formation:

> The Abo formation in the Gran Quivira quadrangle consists of dark-red shale (about 70 percent) and sandstone and arkose (about 30 percent). The shales are characteristically muddy, and some beds are micaceous.

Bursum Formation

The Bursum formation and its type site was defined by Wilpolt et al. (1946). The formation is 250 feet thick at its type site and is assigned to the Permian although as in the Abo formation there is conflicting evidence for its age.

The Bursum formation consists of arkosic sandstone, shale and conglomerates in the lower beds and marine limestone and shale in upper stratigraphic beds.

Madera Limestone

Keyes (1903) gives the name Madera limestone to the upper Pennsylvanian limestone found in the Sandia Mountains. The limestone is 1,102 feet thick in Abo Canyon. The Madera limestone has two components, an arkosic limestone in the upper part and a marine limestone member of gray dense and cherty limestone.

Sandia Formation

Herrick (1900) applied the name Sandia formation to a section of shale, sandstone and conglomerate section of the Sandia Mountains in 1900. Bates et al. describes the lithology of the formation:

> The upper member of the Sandia formation consists of light gray siliceious quartz-pebble conglomerate containing plant fossils; pink and gray cross:bedded sandstone and conglomerate with pink angular feldspar fragments up to half an inch in diameter and subround quartz pebbles up to one

> inch; and softer material, presumable shaly, that is largely covered. In the slopes north of Abo Canyon the member is represented by beds 133 feet thick, but as the lower beds are absent through faulting this is not a full thickness. In Los Pinos Mountains the member has a maximum thickness of 350 feet (Bates 1947:20-21).

Pre-Cambrian Rocks

The Pre-Cambrian rocks probably exceed 10,000 feet in thickness and are continuous with those of the Los Pinos Mountains to the southwest. The lithology of this basement complex is quartzite and schist, which is intruded by coarse granites.

TECTONICS

To the west of the Monument lies the wooded Jumano Plateau and the Los Pinos Mountains. Thirty miles to the northwest lie the Manzano Mountains. To the north the Jumano Plateau also slopes in from the west and north. Twenty miles to the northwest lie the Pre-Cambrian Pedernal Hills. Fifteen miles to the east lie the Gallinas Mountains, with the Carrizo and Sierra Capitans in its background. To the south lie a series of low juniper covered hills that stretch toward the Sierra Blanca. These surrounding mountains have produced a closed basin drainage system for the region. However, most of the water falling in these ranges seldom reaches the lower basins.

The Manzano Mountains

Throughout the Manzanitas section of the Manzano Mountains, the Pennsylvanian strata lie nearly flat on the Pre-Cambrian granite. Farther south the sedimentary strata are more tilted, the younger strata have been eroded down or completely off. The exposed facade on the west is Pre-Cambrian granite. The highest point within the Manzano range is Manzano Peak whose summit is 10,098 feet above sea level.

Los Pinos Mountains

The Los Pinos Mountains lie south of the Manzanos. The western slopes are comprised of Permian and Pennsylvanian strata which overlie the Pre-Cambrian basement granites. The highest peak is Whiteface Mountain whose summit is 7,530 feet above sea level.

Gallinas Mountains

The Galinas Mountains lie east of Los Pinos Mountains, with Gran Quivira inbetween.

Gallinas Peak is the highest point within the range, whose summit is 8,637 feet above sea level. Gallinas Peak is a laccolith formed by an intrusion of granite through the Pennsylvanian and Permian strata.

Carrizo and Capitan Mountains

These mountains are essentially laccoliths in which igneous intrusives have been forced through the Pennsylvanian and Permian strata and in which much or the overlying strata and sediments have been removed through erosion. Carrizo Peak is 9,656 feet above sea level and the summit of Capitan Peak is 10,083 feet above sea level.

Sierra Blanca Range

This range with Sierra Blanca Peak at 12,003 feet above sea level dominates the eastern mountains. This range is essentially the remains of extensive volcanic activity. It is made up of igneous tuff and flows. There is evidence that during the Pleistocene that parts of the slope of Sierra Blanca were glaciated.

SOILS

There are two excellent references (Bourlier et al. 1970; Lopez and Cox 1979) available for the soils of the area. The reader is referred to these two excellent works, even though the author is somewhat familiar with soils, he does not feel that their descriptions could be improved upon without an additional soil survey and soil testing program. The descriptions of both sets of studies are briefly abstracted for the benefit of the reader.

Bourlier et al. (1970) gives an excellent overview and aerial outlines of the soils present in Torrance County which includes only the northern half of Gran Quivira National Monument. However, only two types are present: (1) the Otero and Palma soils [OP], and (2) Chupadero loamy fine sand [CM] (Figure 3).

Cm Chupadera Loamy Fine Sand 5 to 15 Percent Slope

This soil is subject to severe wind erosion when not protected with adequate plant cover. It has low capacity to store moisture. The surface layer takes in water rapidly, and internal drainage is rapid above the bedrock. Plant roots penetrate easily but are restricted mainly to the material above the weathered bedrock. Surface runoff is slow.

This soil is suited to production of native grasses. Grazing should be managed so that plants can increase in vigor and density and so help to control wind erosion. The vegetation consists mainly of blue grama, sand dropseed, little bluestem, New Mexico feathergrass, needle-and-thread, snakeweed, and moderate to thick stands of pinyon and juniper (Bourlier et al. 1970:18-19).

Op Otero and Palmer Soils 1 to 9 Percent Slopes

These sandy soils are easily eroded by wind when they are not adequately protected by plant cover. They absorb water rapidly and have a moderate capacity to store moisture for plants. They release the moisture readily, and plants respond quickly to rainfall. Surface runoff is slow to very slow, and internal drainage is medium to rapid. Fertility is low, and the organic-matter content is low.

These soils are used mainly for production of native forage. Yields are less affected by lack of rainfall than are yields on finer textured upland soils. Sand dropseed, blue grama, and yucca make up most of the native forage in areas in the

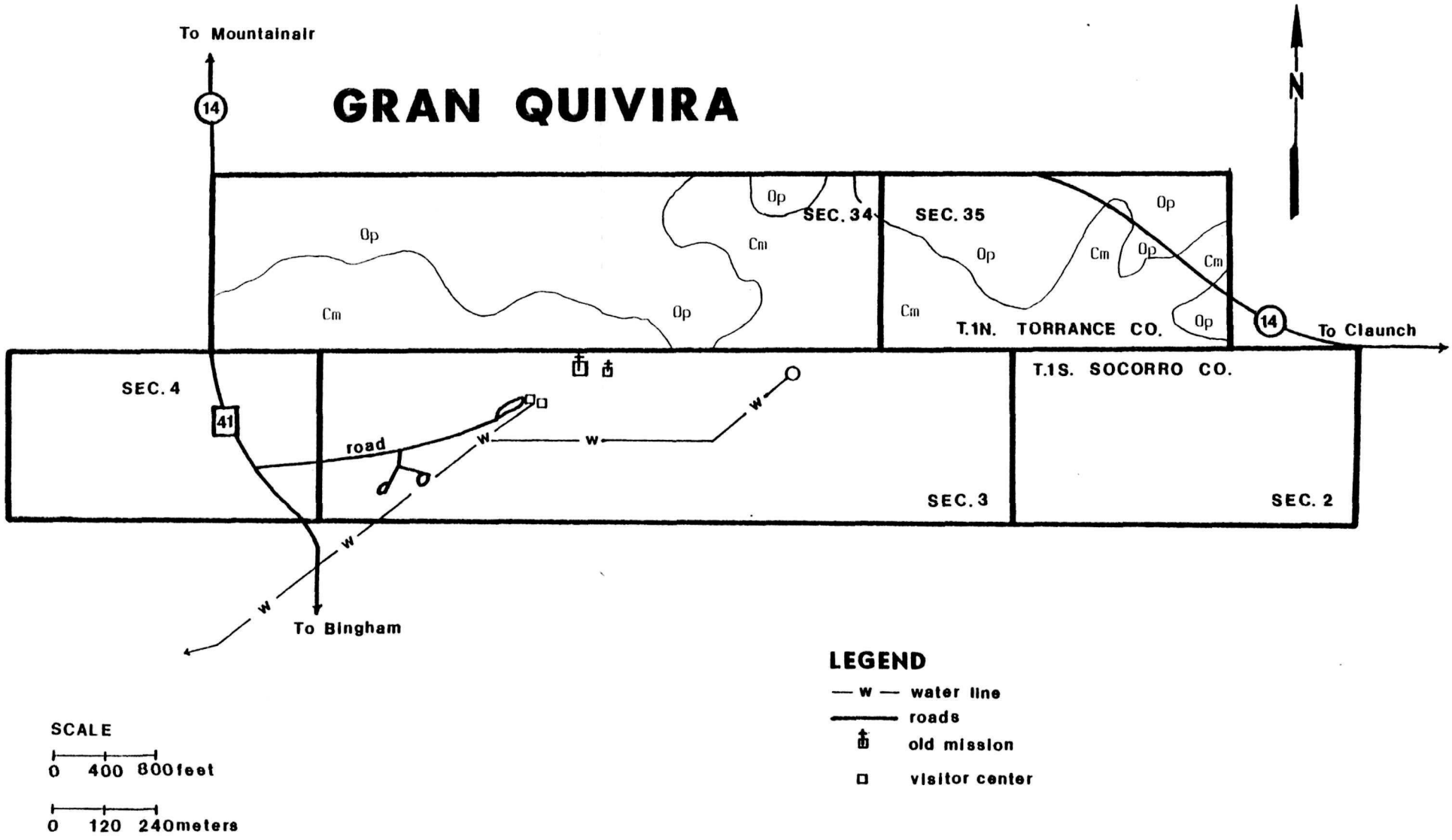


Figure 3: Soils As Defined By Bourlier et al. 1970. Cm = Chupadera Loamy Fine Sand; Op = Otero and Palmer Soils.

> eastern part of the survey Area. The most common plant cover in the southern part of the Area is made up of light to moderate stands of pinyon and juniper and an understory of sand dropseed, blue grama, sand sage, yucca, and cactus (Bourlier et al. 1970:34).

The other more detailed soil survey by Lopez and Cox (1979) was done under contract by Earth Environmental Consultants, Inc. for the National Park Service. In this soil survey, six soil units were discussed (Figure 4): (1) Royosa [RO]; (2) Otero - Palma - Complex [OP]; (3) Otero - Palma - Chupadera Complex [OT]; (4) Otero - Palma - Chupadera Complex [OC]; (5) Chupadera [CH]; (6) Disturbed Areas [DI]. Soil units (3) and (4) differ in the degree of slope of the surfaces on which they occur.

The following are soil descriptions of the mapping units taken from Lopez and Cox, 1979:

> RO Royosa Loamy Fine Sand, 1 to 8 Percent Slopes
>
> The unit consists of deep, well or somewhat excessively drained soils that formed in eolian material from mixed sources....In a representative profile, the surface layer is light brown loamy fine sand, about 5 inches thick. The substratum is reddish yellow loamy sand, several feet thick....This unit occurs on nearly level to sloping low hummocky uplands. The map unit is found in the southwestern part of the survey area. The soil has a rapid permeability and surface runoff is slow. The available water capacity is about 2.8 to 4.4 inches and effective rooting depth is about 60 inches. Water erosion hazard is slight and wind erosion hazard is severe.

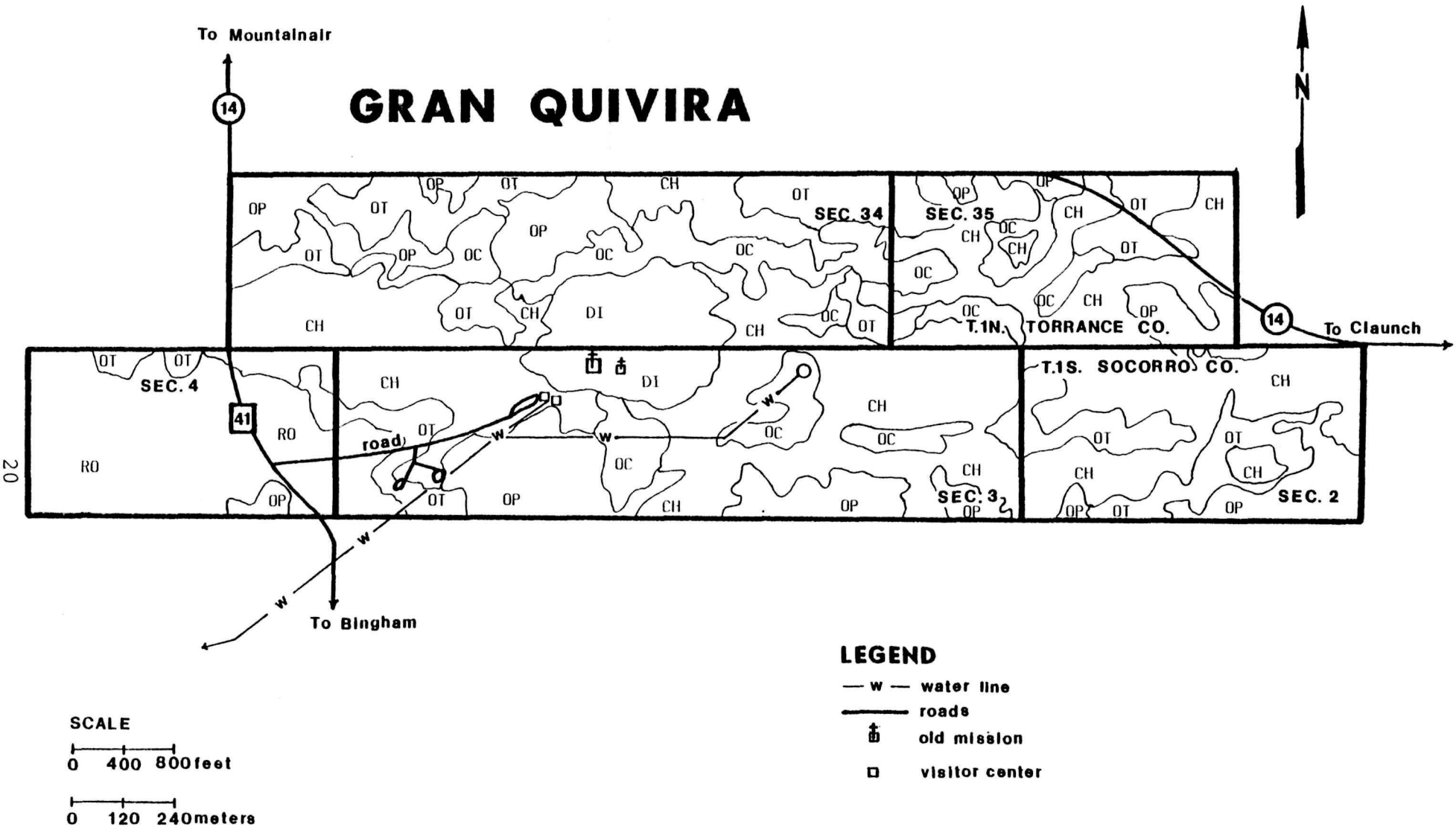


Figure 4: Soils As Defined By Lopez and Cox 1979. RO = Royosa Loamy Fine Sand; OP = Otero-Palma Complex; OT = Otero-Palma-Chupadera Complex, 0-8 Percent Slopes; OC = Otero-Palma-Chupadera Complex, 8-15 Percent Slopes; CH = Chupadera Loamy Fine Sand; DI = Disturbed Area.

OP Otero-Palma Complex, 0-8 Percent Slopes

This mapping unit consists of 50 percent Otero fine sandy loam, 40 percent Palma fine sandy loam, and about 10 percent inclusions

This complex occurs on nearly level to sloping open grassland areas. The Otero soils are as described for Otero Series and Palma soils are as described for Palma Series. The Otero and Palma Series have a rapid permeability and surface runoff is slow. Available water capacity is about 6.0 to 7.2 inches and effective rooting depth is greater than 60 inches. Water erosion hazard is slight and soil blowing hazard is moderate to severe depending on the amount of protective or vegetative cover.

OT Otero-Palma-Chupadera Complex, 0-8 Percent Slopes

This mapping unit consists of 40 percent Otero fine sandy loam, 30 percent Palma fine sandy loam, 20 percent Chupadera fine sandy loam, and about 10 percent inclusions.

The unit occurs on nearly level to sloping ridges, sideslopes, and swales. Otero and Palma soils occur on toeslopes and swales, and Chupdera soils occur on sideslopes and ridges. The Otero soils are as described for Otero Series and Palma soils are as described for Palma Series. The Otero and Palma Series have a rapid permeability and surface runoff is slow. Available water capacity is about 6.0 to 7.2 inches and the effective rooting depth is greater than 60 inches. Water erosion hazard is slight and soil blowing hazard is moderate. The Chupadera soils are as described for the Chupadera Series. This soil has a moderately rapid permeability and surface runoff is moderately slow. Available water capacity is about 2.8 to 3.6 inches and effective rooting depth is less than 40 inches. Water erosion hazard is moderate and soil blowing hazard is moderate.

OC Otero-Palma-Chupadera Complex, 8 to 15 Percent Slopes

This mapping unit consists of 35 percent Otero fine sandy loam, 30 percent Palma fine sandy loam, 25 percent Chupadera and about 10 percent inclusions.

The unit occurs on sloping to moderately steep ridges, sideslopes, and swales. Otero and Palma soils occur on swales and toeslopes, and Chupadera soils occur on sideslopes and ridges. The Otero soils are as described for Otero Series and Palma soils are as described for Palma Series. These soils have a rapid permeability and surface runoff is moderately slow. Available water capacity is about 6.0 to 7.2 inches and effective rooting depth is greater than 60 inches. Water erosion hazard is moderate and soil blowing hazard is moderate. The Chupadera soils are as described for Chupadera Series. This soil has a moderately rapid permeability and surface runoff is moderately slow. Available water capacity is about 2.8 to 3.6 inches and effective rooting depth is less than 40 inches. Water erosion hazard and soil blowing hazard are both moderate to severe.

CH Chupadera Loamy Fine Sand, 0 to 15 Percent Slopes

This mapping unit is composed primarily of that soil described as the Chupadera Series. This unit occurs on nearly level ridge tops to moderately steep sideslopes. This soil has a moderately rapid permeability and surface runoff is moderate to slow. Available water capacity is about 2.8 to 3.6 inches and effective rooting depth is less than 40 inches. Water erosion hazard is moderate and soil blowing hazard is moderate.

DI Disturbed Area, 0 to 10 Percent Slopes

The Disturbed Area includes the ruins and that area around the ruins. The soil in the area is classified tentatively into the Entisols soil order, which is the highest level of categorization in the soil classification system. The soils are characterized by an Anthropic Epipedon, which indicates the soils developed under human habitation. The unit consists of shallow to deep, generally skeletal soils. They formed under the influence of the long-continued use of the soil by man as a place of residence. The disturbed area occurs on a knoll of a ridge and on its sideslopes.

CLIMATIC CONDITIONS

The general climate around Gran Quivira National Monument has a great variation season to season and between adjacent geographical areas. Climate variation is due to the natural variations of altitude and geographical features of the area. The climate also tends to fluctuate through the years, the cyclic pattern of wet and dry periods being the most crucial for marginal agricultural economies. The controlling factors that result in climatic differences from one area to another are (1) latitude, (2) location with regard to moisture laden winds, and (3) differences in elevation (Tuan et al. 1973:186-188). There are no nearby long range weather stations, the closest ones being Socorro to the west and Tajique to the north.

The project area is located 25 miles south-southeast of Mountainair, New Mexico, at a latitude of 34 degrees 16 minutes north, and a longitude of 106 degrees, 5 minutes west. The altitude of the Monument proper varies from 1926 meters (6,320 feet) above sea level in the southwest portion to 2000 meters (6560 feet) above sea level in the central portion. This altitude is about 1000 feet above the average elevation for the state of New Mexico. The prinicipal sources of moisture for precipitation are the Pacific Ocean, 750 miles to the west and the Gulf of Mexico, 750 miles to the southeast.

PRECIPITATION AND TEMPERATURE

The project area receives about 16 inches of rain per year (Tuan et al. 1973:18). The largest amount of this precipitation falls during the summer months when moist tropical air flows inland from the southeast due to the anticyclonic circulation of the subtropic high cells located in the Gulf of Mexico. These summer rains account for over half of the annual rainfall (Figures 5-9). During the winter months, air currents from the northwest usually bring moisture in the form of snow from the Pacific air masses coming in from the west coast. However, these are generally expended before crossing the western and central New Mexico mountain ranges producing a "rain shadow" effect on the region.

Temperatures range from -20 in the winter to 105 degrees Fahrenheit in the summer. The area also experiences strong spring winds as does most of New Mexico.

Due to the altitude of the project area, the frost-free growing season is only about 160 days long (Figure 10). The short growing season coupled with the lack of perennial water has historically allowed only dry land farming. Historically beans and corn were the major crops in the area.

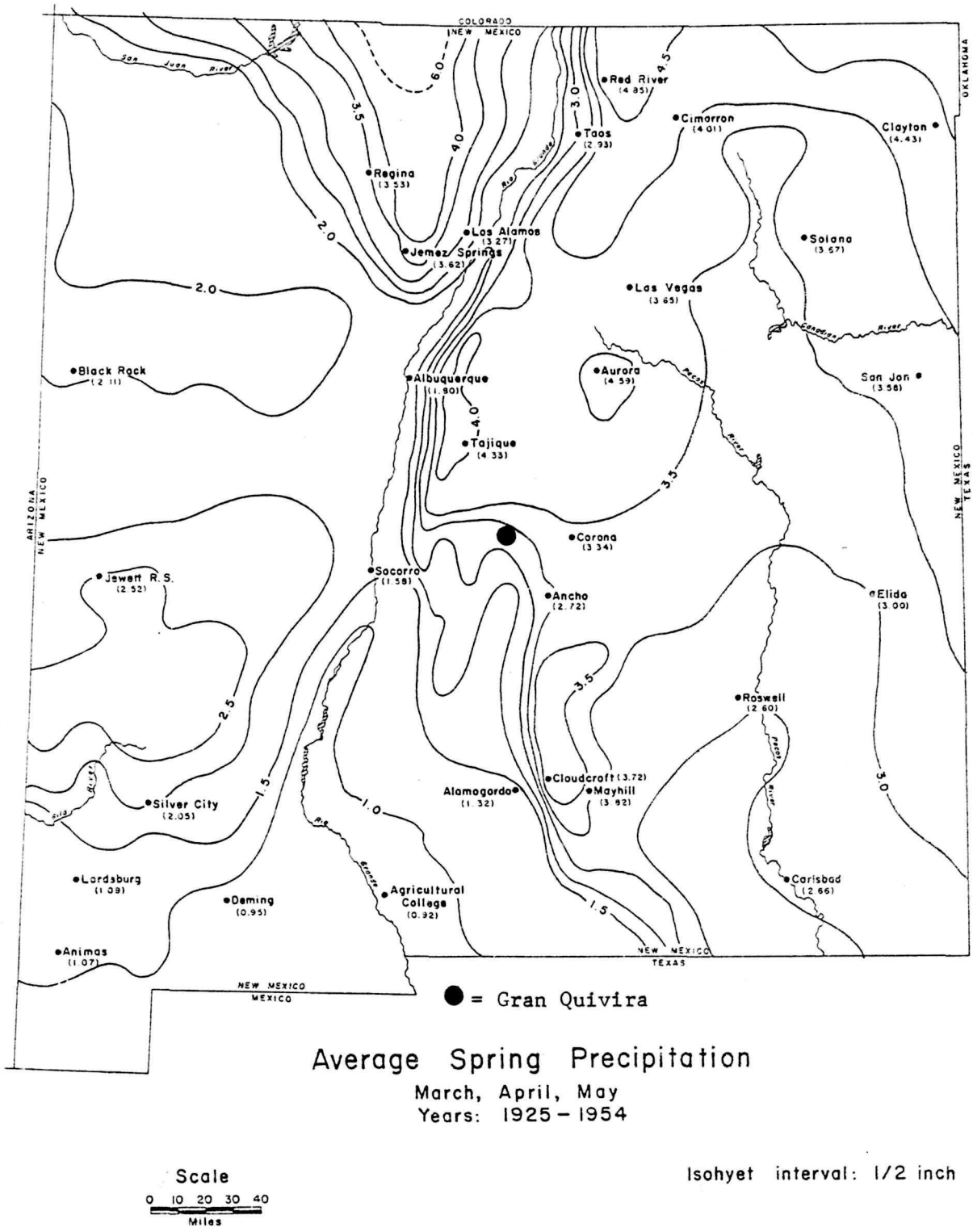


Figure 5: Average Spring Precipitation (Tuan et al. 1973:31).

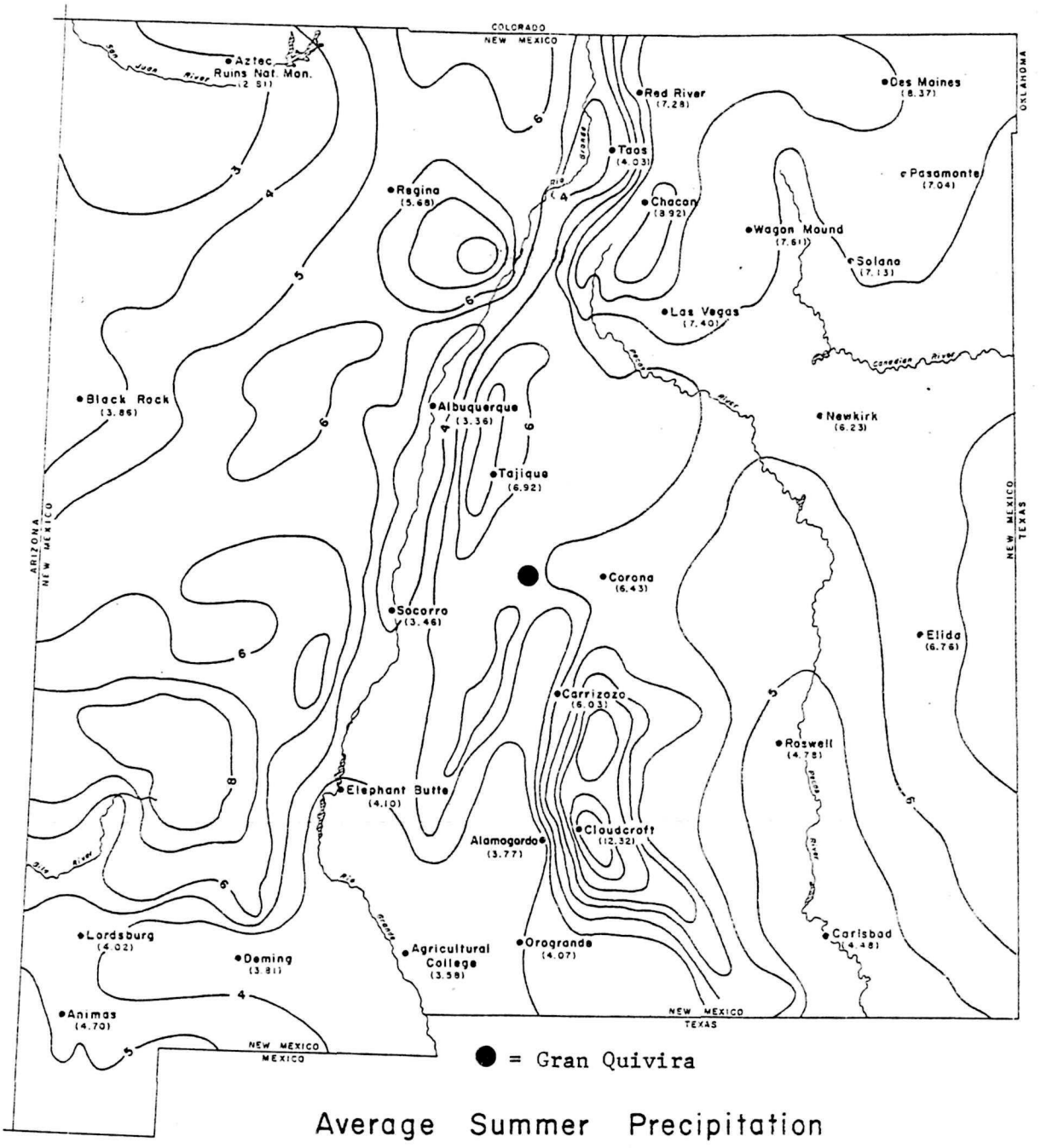


Figure 6: Average Summer Precipitation (Tuan et al. 1973:32).

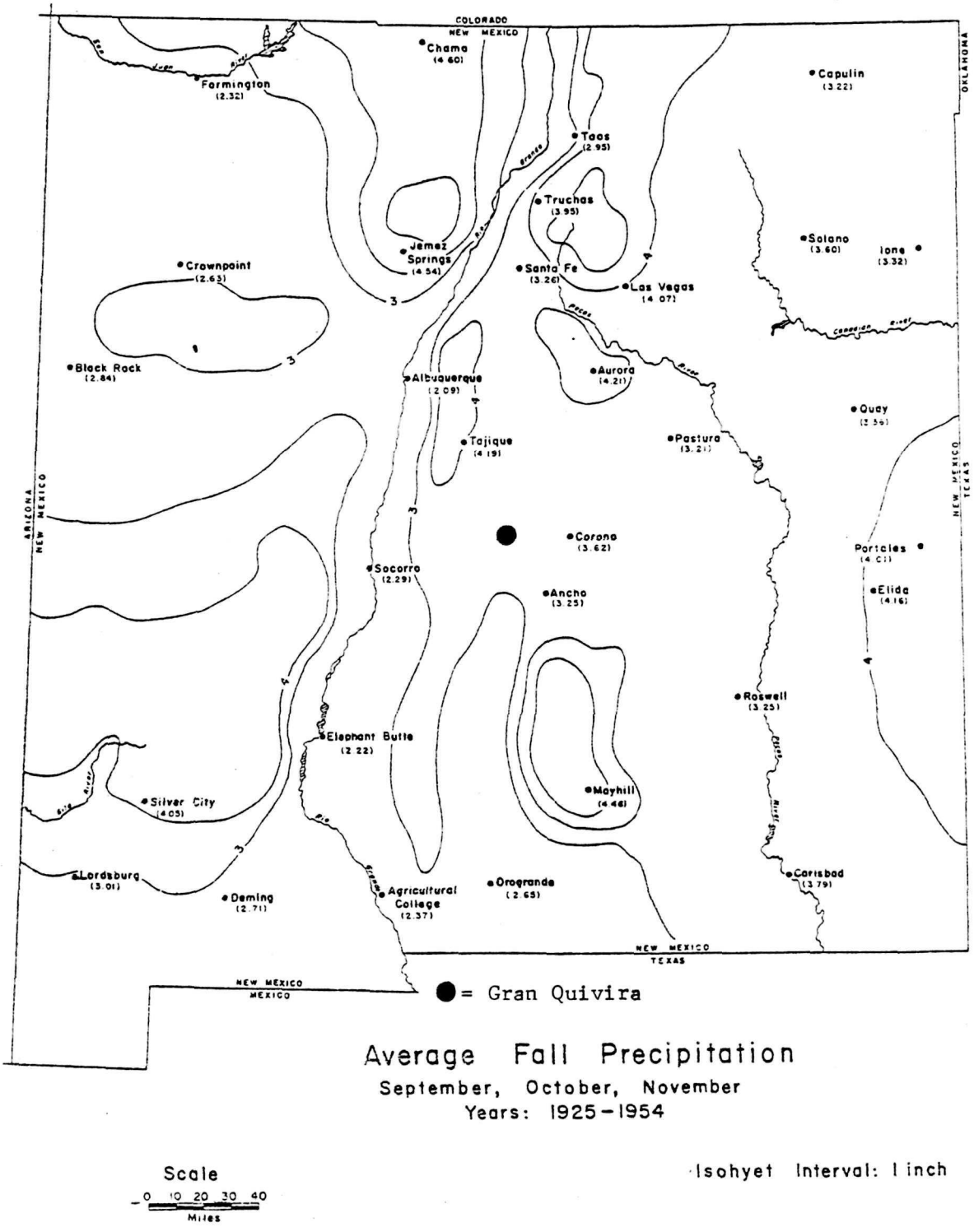


Figure 7: Average Fall Precipitation (Tuan et al. 1973:33).

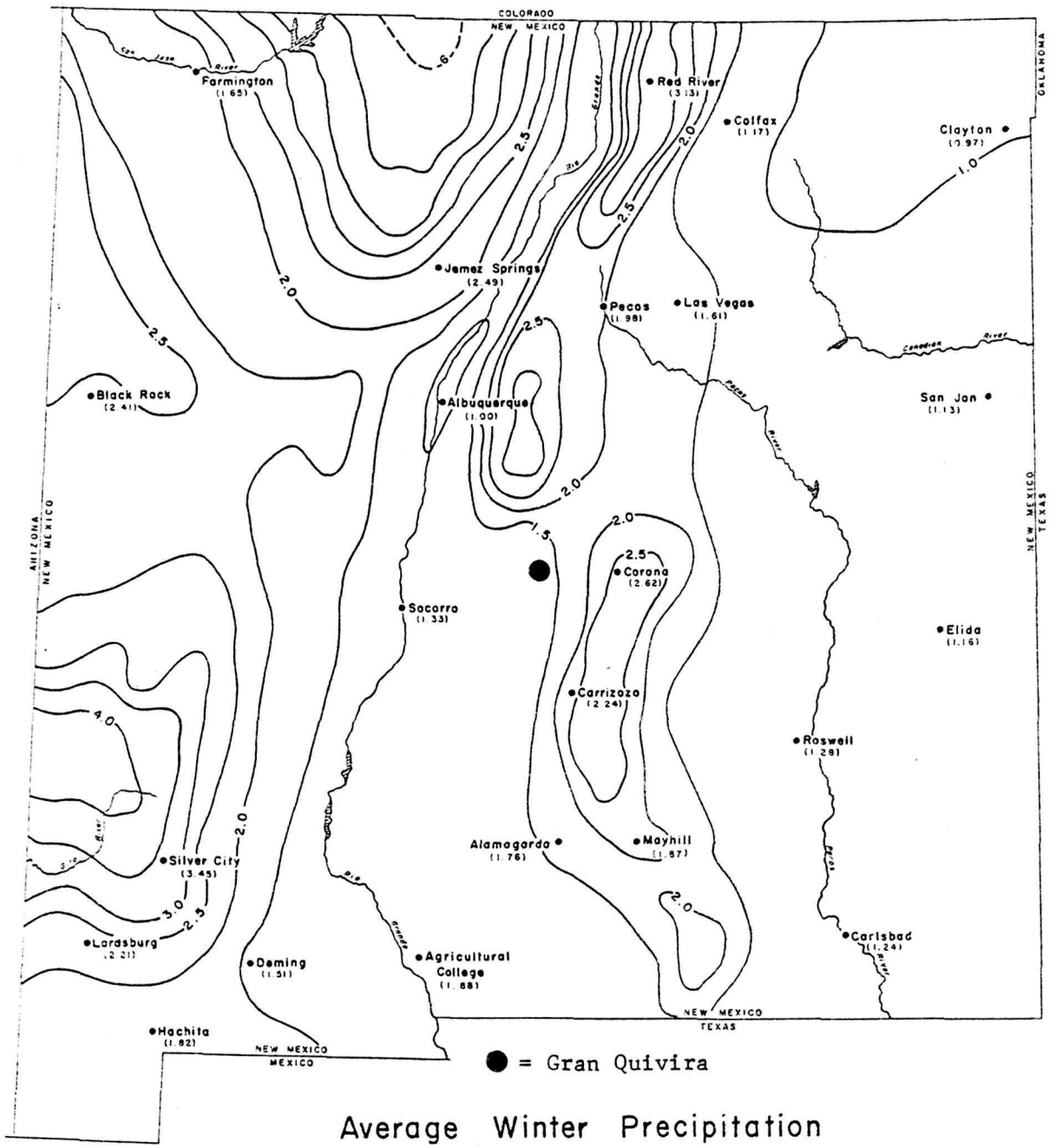


Figure 8: Average Winter Precipitation (Tuan et al. 1973:30).

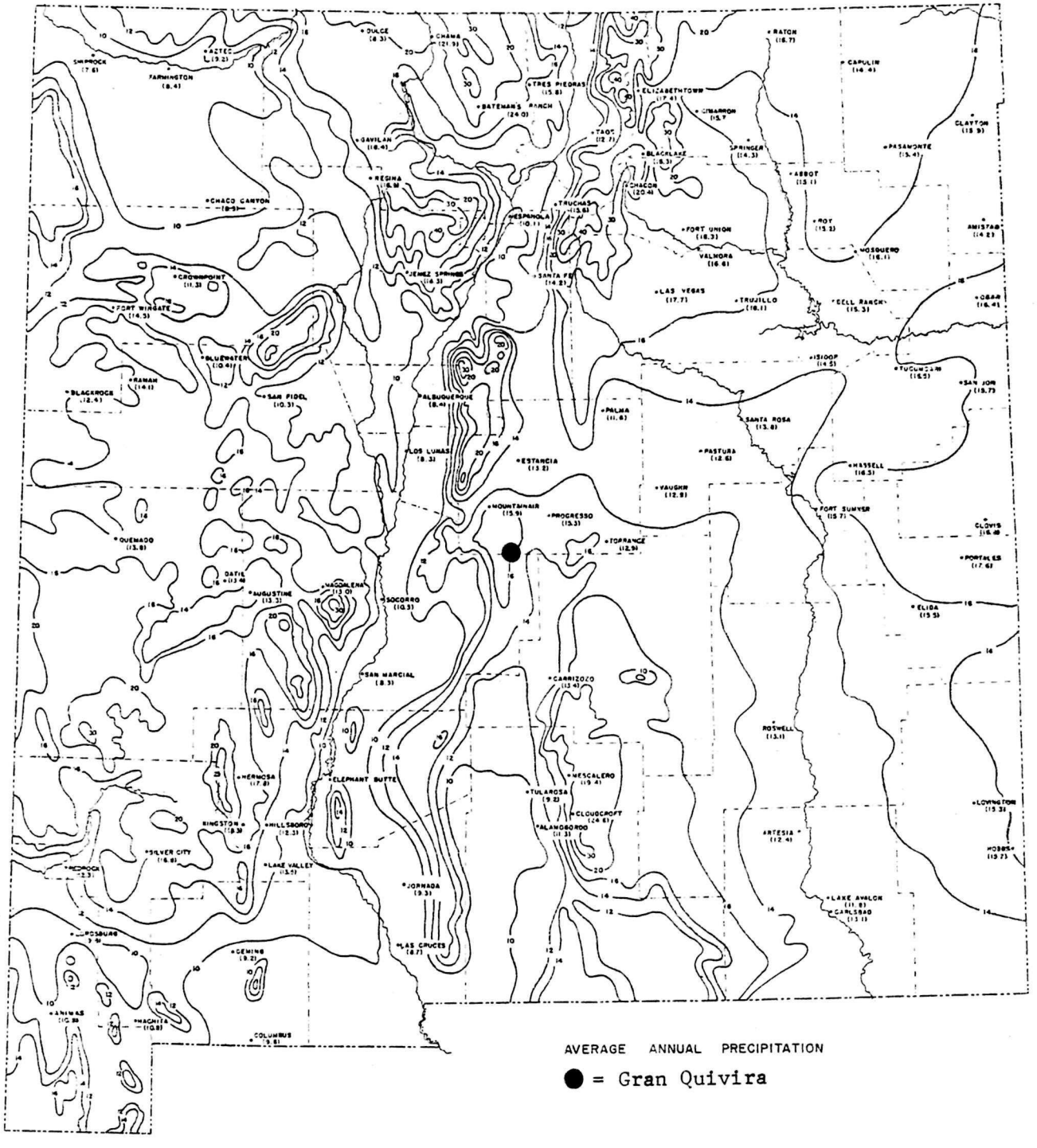
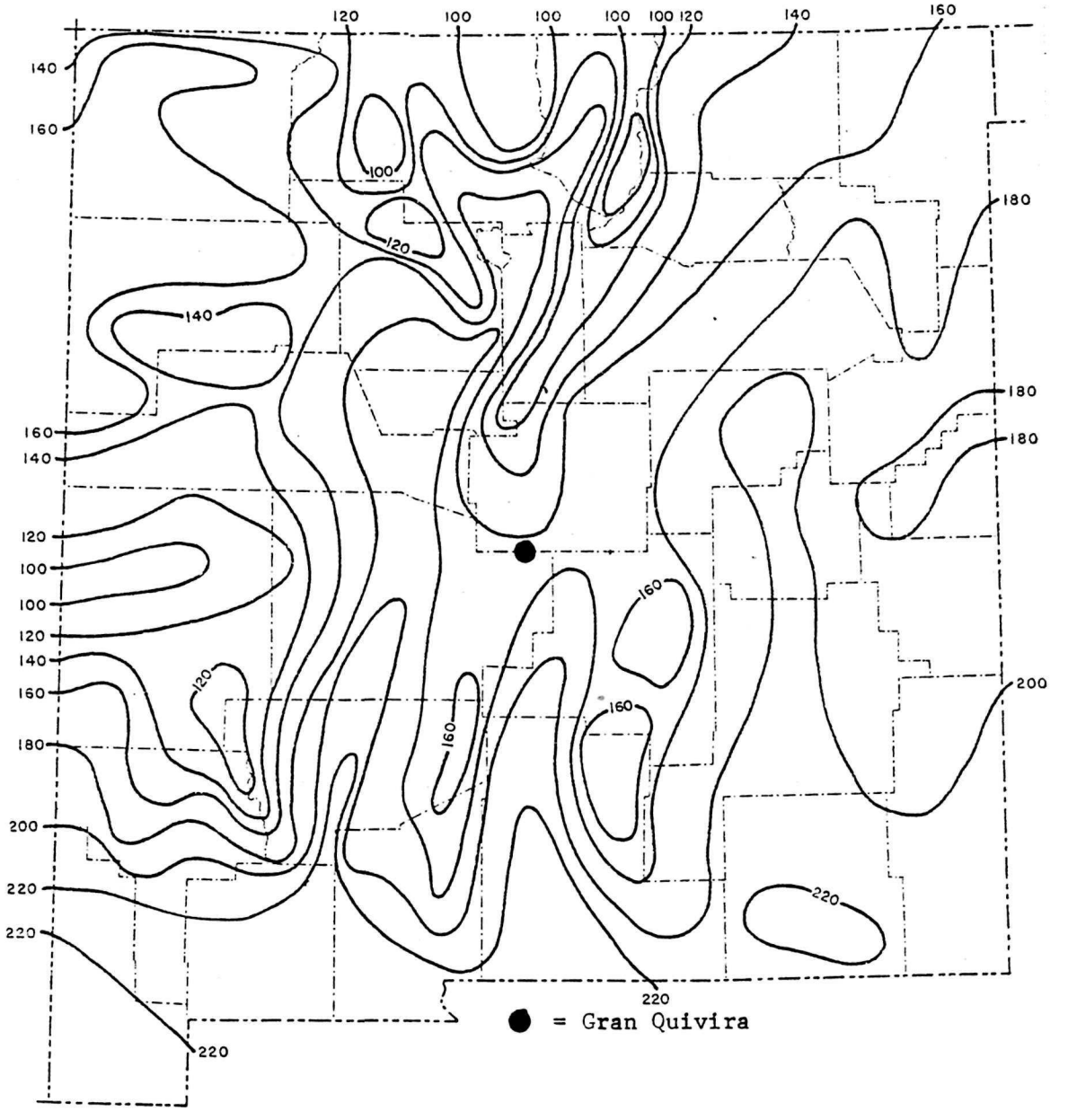


Figure 9 : Average Annual Precipitation (Tuan et al. 1973:18).



AVERAGE NUMBER OF DAYS WITHOUT KILLING FROST

Figure 10: Average Number of Days Without Killing Frost (Tuan et al. 1973:87).

Corn was the principal crop of Las Humanas (Hayes 1981a:10) and a large amount of corn was obtained during the Mound 7 excavation. In 1958, Richard Howard (Howard 1958) planted two crops of maize (May and July) at Gran Quivira within a small plot. The planting corn was obtained from Mesa Verde. Howard further states:

> At no time during the season was the plot irrigated or fertilized artifically. I did, however, manually pollinate some of the silks because of the small amount of maize which was planted (Howard 1958:1).

Howard's experiment showed that a major corn crop could be planted in May and smaller later plantings could be planted until July which would provide the local inhabitants with fresh corn until October.

Howard's (1958:2) precipitation table is reproduced here for reference.

	Actual	Normal
May	0.50"	1.12"
June	0.53"	1.24"
July	1.13"	2.43"
August	3.54"	2.93"
September	2.58"	1.96"
October	1.38"	0.95"

The relative success of bean farming in the area can be attributed to the fact that beans can be planted rather late avoiding late, killing frosts and usually reaching maturity before the first killing frost of the fall. This pattern also allows the crop to benefit from the precipitation that falls during the summer months.

GROUND AND SURFACE WATER

During the summer, early fall and other months of heavy rainfall, there are a number of playas that hold some water for short periods of time. Twenty-five miles to the north/northeast is located the largest of these ephemeral lakes, Laguna del Perro (Lake Estancia during the Pleistocene), which retains water especially during the rainy season for most of the year. Laguna del Perro seldom holds more than a foot of water, even though it stretches for twelve miles in length and is almost a mile wide.

The Estancia Basin today is a flat, grassy, closed valley with an elevation of about 6,000 feet above sea level. During the late Pleistocene, water covered the Estancia Basin (Lake Estancia) with depths of up to 150 feet and covered an area of about 450 square miles (Meinzer 1911:18).

In order to maintain a lake level of that magnitude, Leopold (1951:164, 166) postulated that Lake Estancia must have

existed at a time when temperature was lower and precipitation greater than present. Leopold further postulates that the snowline is depressed 150 meters, therefore: July temperatures lowered 16.2° F; January lowered 5° F., and intervening months proportionately. This had the effect of reducing the annual mean temperture by 11.8° F. Antevs, in analyzing the last glaciation of Cary Age, states:

> The mean June-September temperature in the state could then have been about 10° F. lower, and the annual precipitation over pluvial Lake Estancia, some 9 inches greater than now. On the latitude of Santa Fe, the snowline and the life- and climatic-zones stood 4,000 feet lower than at present (Antevs 1954:189).

It is along the old lake shore lines that early man sites were recorded by Lyons (1969). The lake water during this time period was probably not very saline and provided a good potable water supply.

The Estancia valley to the north and the Mesa de las Jumanos are essentially closed basins. The pattern of interior drainage within the old basins results in a number of playas that have gathered runoff which has resulted in mineral deposits, mostly in the form of salt, giving the area its Spanish name the Salinas.

The Salinas Region, except for the slopes of the Manzanos, is entirely devoid of perennial streams or rivers. The heavy

summer rains and the melting snow of the spring sometimes leaves the many shallow alkali playas and salt lakes with standing water, but these all dry up and disappear during times of drought. While some subsurface water is available, good potable water is very scarce. Most well water comes from the Yeso formation and is generally chemically unsuitable for drinking or irrigation, but is used in some areas for watering livestock. Bates et al. summarizes the available ground water in the region:

> Records of drilling for water are so scanty that it is impossible to present a detailed picture of the ground-water resources of the quadrangle. Water is known to have been found in recent sands and gravels, in the Joyita sandstone member of the Yeso formation, and in a sandstone of the Abo formation.
>
> Shallow wells reaching only into unconsolidated arroyo sands and gravels have been dug or drilled at numerous places especially to the west of Chupadero Mesa. The volume of water produced is low but is generally sufficient for a family's domestic needs and for watering a small number of cattle.
>
> Although several wells on Chupadera Mesa have been drilled through the San Andres formation, it has been found that the underlying Glorieta sandstone is not a water-bearer and the wells have been carried deeper into the upper beds of the Yeso formation. It is not clear why the Glorieta is non-productive of water; possibly the sandstone is too tightly cemented, or its narrow outcrops may provide an insufficient catchment area. Fair volumes of "gyppy" water, suitable for watering stock, are reported from what is apparently the upper Yeso (Bates et al. 1947:45-46).

There are no springs within the immediate vicinity of Gran Quivira or its closest neighbor, Pueblo Pardo, three miles to the south. The large population of both pueblos would have

required an adaquate and dependable water supply to support daily needs even in times of drought. Historically 32 wells were present (Scholes 1940:282) in the immediate vicinity of Gran Quivira. With the advent of the Spaniards and the accompanying mission needs, these wells were possibly taxed beyond their capabilities.

LOCAL VEGETATION

Gran Quivira National Monument falls into the Central Plains Rangeland Classification (Gay and Dwyer 1970:1), is within the Upper Sonoran Life Zone by Bailey (1913), and in the Plains Region on the Potential Natural Vegetation Map, New Mexico (Donart et al. 1978:map).

The archaeological survey took place in late fall and early spring as weather permitted. During this time of the year, many of the annual plants were not readily identifiable. When identifiable, perennials and annuals were recorded on all site forms. Bailey gives a brief description of the Upper Sonoran Life Zone for this area:

> The foothill division of this zone is of particular interest along the eastern slope of the mountains, where it carries picturesque little forests of nut pine, juniper, and scrub oaks, with tree cactus, prickly pear, yuccas, red barberry, skunk brush (Schmaltzia trilobta), and other shrubs scattered between....The natural growth of grama and other grasses is good and forms fine grazing, while the gulches and timber afford good shelter for stock (Bailey 1913:70).

A detailed vegetation study was done by Pache (1979) of Earth Environmental Consultants, Inc. for the NPS. He subdivided the various plant communities by use of aerial photographs and then field checked these communities in December 1978 and May 1979. Pache's Table 1 is reproduced here for ready reference as parts of it reflect artifact density and cultural resources, as we shall see later.

PLANT COMMUNITIES, ACREAGES, AND THEIR GENERAL DISTRIBUTION ON GRAN QUIVIRA NATIONAL MONUMENT (Pache 1971:3)

Plant Community	Acreage	General Location
Sandy grassland	74.4	SE corner/N. central
Upland shrub-grassland ruins	29.3	hill around
Deep and shrub-grassland	29.9	western portion
Juniper woodland		
Subunit A	417.8	central and eastern portions
Subunit B	52.5	western portion
Revegetation area	6.1	eastern portion within juniper woodland (subunit A)
TOTAL	610.0 acres	

The breakdown for the plant communities are given below for the reader's reference. These lists are abstracted to only include Pache's (1979) observations for these areas (cf. Figure 11). These observations were made in December 1978 and May 1979 and do not comprise the total general plant

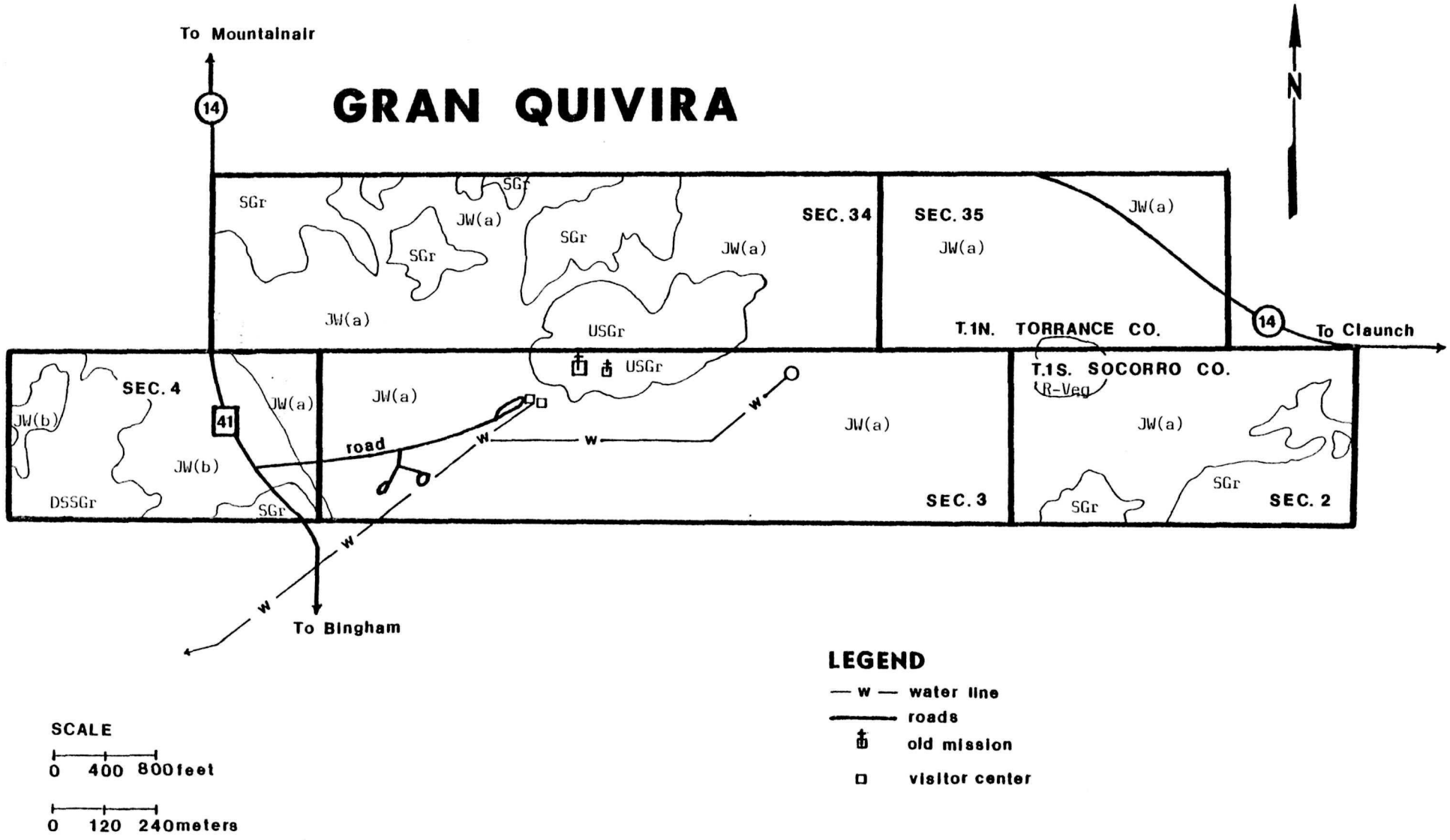


Figure 11: Vegetation Map As Defined By Pache 1979. SGr = Sandy Grassland; USGr = Upland Shrub-Grassland; DSSGr = Deep Sand Shrub-Grassland; JW(a) = Juniper Woodland; JW(b) = Juniper Woodland.

species list that encompass other vegetation usually found in these plant communities, in other areas.

Sandy Grassland:SGr (Abstracted from Pache 1979:5)

Primary	Secondary	Invader
Blue grama	Little bluestem	Walkingstick cholla
Sand dropseed	Three-awn sp.	Prickly pear
Mesa dropseed	Ring muhly	One-seed juniper
Needleandthread grass	Soaptree yucca	Emery oak
Bush muhly	Broom snakeweed	

Upland Shrub-Grassland:USGr (Abstracted from Pache 1979:8)

Primary	Secondary	Invader
Needleandthread grass	Indian ricegrass	One-seed juniper
Spike muhly	Spike dropseed	
Texas-timothy	Three-awn sp.	
Rubber rabbitbush	Brown snakeweed	
Fourwing saltbush	Soaptree yucca	

Deep Sand Shrub-Grassland:DSSGr (Abstracted from Pache 1979:10)

Primary	Secondary	Invader
Little bluestem	Needleandthread grass	Three-awn sp.
Sand bluestem	Pinyon pine	Ring muhly
Big bluestem	Squawbush	Broom snakeweed
Blue grama		
Sand sagebrush		
Soaptree yucca		

Juniper Woodland:JW(a) (Abstracted from Pache 1979:13)

Primary	Secondary	Invader
Little bluestem	Sand muhly	Broom snakeweed
Blue grama	Three-awn sp.	
One-seed juniper	Bottlebrush squirrel tail	
Indian grass	Pinyon pine	
Soaptree yucca	Squawbush	
Datil yucca	Big sagebrush	
	Emery oak	

Juniper Woodland:JW(b) (Abstracted from Pache 1979:16)

Primary	Secondary	Invader
Little bluestem	New Mexico feathergrass	Three-awn sp.
Big bluestem	Pinyon pine	Broom snakeweed
Sand bluestem	Sand sagebrush	
Needandthread grass	Squawbush	
Sand muhly		
Soaptree yucca		
One-seed juniper		

Local Fauna

Gran Quivira National Monument falls into Bailey's Upper Sonoran life zone (Bailey 1913:69). Scott's (1979) faunal survey of Gran Quivira National Monument resulted in 47 pages of faunal data and listings. To reproduce those findings for this report seems unjustified and the reader is referred to the report on file with National Park Service. In addition, several other sources are recommended for the area: Findley et al. 1975 (summarized museum records); Peterson 1961 (birds), Robbins, Bruun and Zim 1966 (birds); and Stebbins 1966 (reptiles and amphibians).

The most important contribution to the prehistoric faunal resources found at Gran Quivira are the extensive lists of bone found during the Mound 7 excavations by McKusick (1981:39-74). No attempt will be made here to duplicate these excellent listings, but McKusick's summary of the mammal remains gives an excellent overview of the changes in meat availability or preference of the local population and is reproduced here for the reader's benefit

> All native mammalian species identified from Mound 7 have been recovered from other Southwestern archeological excavations, and, with the exception of the bison and the prairie dog, which were exterminated by man, they are still found in the general area. Species represented reflect primary usage of faunal resources from the grasslands, less from the pinyon-juniper woodlands, and very little from riparian sources.
>
> There is some variation in frequencies of artiodactyls during the three periods. Mule Deer, pronghorn, and bison frequencies are highest in the Middle Phase. White-tailed Deer, which are infrequent throughout all periods, appear to increase during the Late Phase. The most conspicuous change is the Late Phase introduction of cattle, sheep, and goats, with a simultaneous sharp drop in the number of pronghorns.
>
> In meat produced by the mammals processed at Las Humanas, bison led native mammals during all periods, followed by pronghorns. However, introduced domestic animals exceeded bison in meat production in the Late Phase sample, even though they are not recorded in substantial numbers at Las Humanas before late A.D. 1659 (Hackett, 1937, p.142).
>
> Domestic Swine are present in limited number in Mound 7. They were never common in colonial New Mexico, and the date of their introduction is in question. The most probable period for their

utilization at Las Humanas would have been between A.D. 1659 and 1672.

The only indications of a possible surplus of faunal resources are the presence, in Early Phase samples, of unbroken long bones of pronghorns, from which the marrow had not been extracted, and the brain cases of deer, from which the facial parts had been removed as if to store the brain for future use (McKusick 1981:65).

CHAPTER THREE

GRAN QUIVIRA: THE ARCHAEOLOGICAL RESOURCE

GRAN QUIVIRA: THE ARCHAEOLOGICAL RESOURCE

A BRIEF ARCHAEOLOGICAL OVERVIEW OF THE SALINAS PROVINCE

Introduction

The prehistory of Gran Quivira and the surrounding Salinas Province and their environs is quite complex and long in duration. This overview of the prehistory of the region is being provided so that the reader will better understand some of the archaeological problems of the region along with the significance and potential of the cultural resources available within the various units of the Salinas National Monument and within Gran Quivira in particular.

The first humans to visit the region were the big-game hunters of the Clovis and Folsom cultures. Later, during the Altithermal, hunters and gatherers of the Archaic periods exploited its environs. What brought the first permanent settlers there to live in pithouses and later pueblos is still somewhat of a mystery due to the apparent lack of permanent water in the region. This lack of water also plagued early 19th and 20th century visitors to the area. However, we do know that water was obtainable at Pueblo de Las Humanas during the early Spanish Colonial period in the form of 32 wells located near the pueblo.

PaleoIndian or Lithic Stage (10,000-5,500 B.C.)

The earliest human occupation in the region were the hunters of the Llano complex, which includes the Clovis and Folsom cultures. The Llano complex was proposed by F. H. Sellards (1952) and was derived from the "Llano Estacado," a plain in eastern New Mexico and west Texas where many of the type sites are found. These PaleoIndian hunters date from the Late Glacial and Early Post-glacial times and were mainly hunters exploiting large migratory herbivores. The tool assemblage for the Clovis culture is adapted primarily to big game hunting. Their projectile points and butchering tools have been found in situ with mammoth and extinct forms of bison. Multiple-component sites (those with artifacts from different cultural levels and temporal horizons) are rare in the archaeological record. One of these type sites is found in southeastern New Mexico--Blackwater Draw.

There are three (3) radiocarbon dates for the Clovis occupation at Blackwater Draw, the dates range from 11,040± 500 to 11,630± 400 B.P. All of these dates fall within the accepted 9,000 to 9,800 B.C. range that has been suggested for the Clovis Tradition (cf. Hayes 1964; Judge 1973).

Clovis points are generally fluted, although many specimens have such short flutes they appear to be basally thinned. Family structure for the period was probably organized around

the nuclear family, a highly nomadic band which would be better for their quest of game animals and foraging.

Clovis sites and material are sparce but wide spread throughout the Southwest, and the Salinas Province is no exception. In the northern area of the Salinas, a number of archaeologists (Lyons 1969) have reported Clovis and Folsom points from the edges of the Estancia Basin, a large lake formed during the last Ice Age (Meinzer 1911; Leopold 1951; Antevs 1954). The Mockingbird Site (Weber 1968), another major site, is found to the south of the Salinas Province. Isolated Clovis artifacts have appeared in all the cardinal directions from the Salinas Province.

Chronologically, Folsom follows Clovis. The Folsom economy is also based on the hunting of large herbivores, especially an extinct species of bison. This survey of Gran Quivira produced only one isolated Folsom end scraper. However, Folsom sites have been recorded in the region (Lyons 1969) surrounding the Salinas Province and the Estancia Basin.

There appears to be a hiatus in the archaeological record for the Salinas Province and most of eastern New Mexico between the big game hunting Folsom culture and the start of the Archaic as the decrease of effective mositure appears to have moved the bison and their accompanying hunters farther out onto the High Plains. In eastern New Mexico, the Plano

complex follows the Llano complex and is the last of the so-called Early Man horizons. These cultures were once collectively called the Portales horizon (Hester 1962) at the Blackwater Draw locality. These include Agate Basin, 7,500 B.C.; Cody, 6,000 B.C.; and Angostura, 5,000 B.C. (Agogino 1968:6).

These cultures are generally found farther to the east and north within the High Plains, but a brief return of greater effective moisture between 6,500-6,000 B.C. was accompanied by the expansion of the Cody complex into eastern and central New Mexico. Later, with a decrease in effective mositure in the area, these Plano big game hunters moved back onto the Great Plains and were replaced in southeastern and central New Mexico by an Archaic hunting and gathering tradition at the start of the Altithermal about 5,500 B.C. the Altithermal marked the advent of a drier climate.

Archaic (5,500 B.C. - A.D. 400)

The Archaic is a phenomenon of the post glacial period. Archaic cultures are generally characterized by the hunting of modern species of animals and by a heavy reliance on wild plant foods. Grinding stones and a number of stone tools which were utilized for processing vegetable foods came into common usage. This is the least understood period for the region. Professionally surveyed or excavated sites are almost nonexistent. This may reflect a sparsity of

population or a paucity of research within the region; it is probably the latter.

Most of the Archaic sites known in the northern Salinas Province are from the Estancia Basin (Lyons 1969) and are essentially the same as those found farther west and northwest and identified with the wide-spread Desert culture which has been named the Oshara tradition by Irwin-Williams (1973). The surface material found in local collections within the southern Salinas Province indicates that these materials are fairly consistent with those found farther south such as at Fresnal Shelter (Wimberly, personal communication 1978) northeast of Alamogordo, New Mexico. Most of these projectile points and artifact forms are different than those of the better researched Archaic Oshara tradition materials found to the northwest and of the Cochise materials located to the west of the Salinas Province.

Pithouses (A.D. 400 - 1200)

Ceramics and pithouses mark the advent of a less nomadic lifestyle and provide the first major evidence of village life. This is usually interpreted as the beginning of a heavier dependence upon local agriculture.

The largest amount of brownwares in the early periods would seem to indicate that these first semi-permanent village inhabitants had affiliations with other people to the south

of the Salinas Province. Their roots also seem to go back to the Archaic in the region, with the Archaic artifact assemblages in the southern portion of the Salinas being very similar to those assemblages found farther south. Caperton (1981:4) lists the pithouse occupation from A.D. 800-1200. However, the earlier dates currently available on pure brownware sites in the south should probably push back the dates within this region also.

The first houses in the region were shallow dug pits so that the lower portion of the structure was below ground and the upper portion was above ground. Upright posts provided support for the roof. These semi-subterranean dwellings are called pithouses and are generally scattered small village units. All of the known pithouse sites within the southern portion of the region are characterized by high percentages of Jornada Brown pottery, with various Black-on-white wares in association, the major decorated ware being Chupadero Black-on-white. The intrusive ceramic assemblages vary slightly from the north to the south in the region, and as should be expected, as you proceed north Lino Gray sherd counts increase, and the northern area exhibits some Anasazi wares and the southern area exhibits more Jornada Mogollon wares. An excavated pithouse, Site LA 2579 (Fenenga, 1956:232), located a few miles northwest of Gran Quivira, produced 63.6% Jornada Brown and 15.6% Lino Gray sherds, a few sherds comprising 2.3% of the sherd totals are classified

as Tabira Black-on-white, this type did not come in until after 1545 (Hayes 1981:75), Fenenga (1956:232) assigns these undecorated sherds to Tabira Black-on-white due to the lack of paint. These sherds are probably undecorated Chupadero Black-on-white body sherds.

Jacals (A.D. 1175-1350)

By A.D. 1175, a new architectural style appears, the jacal. The jacal was produced by placing upright stone slabs around the base of the structure. The walls were then constructed of upright poles and mud. Whether these were made of adobe or a waddle-and-daub construction is not known. These jacal rooms were generally placed adjacent to each other with "I" and "L" being the most common (Caperton 1981:4). Jacals sometimes appear in combination with pithouses and later with masonry pueblo structures, suggesting that this building medium was a transitional one between pithouses and masonry pueblo structures.

The use of Jornada Brown ceramics begin to wane, slowly giving way to new wares--Corona Corrugated and Corona Plain, all being utility wares. Chupadero Black-on-white gains in popularity during this period.

Masonry Pueblos (A.D. 1300-1670's)

The jacal architectural style was followed by sandstone and limestone slab masonry construction for large pueblo structures. The inhabitants of the early masonry pueblos

continued to make and use Chupadero Black-on-white, Corona Corrugated and plain wares, but they also started producing Agua Fria Glaze-on-red, one of the earliest glaze wares in the region. It was during this period that many of the large pueblos that were to be visited by the Spanish three hundred years later were beginning to flourish. By the time of the Pueblo Rebellion in 1680, all of these Salinas pueblos had recently been abandoned.

The earliest Masonry Pueblo at Gran Quivira is probably Mound 21, a small square ruin enclosing a plaza. This is the type site for Toulouse's (1960) Gran Quivira focus which probably dates at A.D. 1300-1425 (Stuart, et al. 1981:322). It is during this period that ceramic intrusives and diversity come into wide acceptance. The major new pottery added at Gran Quivira is Agua Fria Glaze-on-red. Toulouse (1960:41) suggests "a joining together of Brownware peoples with the culturally dominent Puebloans at this time and general acceptance of outside traits by the group." The author postulates that due to the great number of pithouse sites on and near the Monument, and in the long term use of Jornada Brown and Chupadero Black-on-white, the pueblo population at Gran Quivira is just a continuation of the local population with an introduction of the new ceramic types and masonry architecture into their existing ceramic inventory.

The Pueblo Colorado Focus defined by Toulouse (1960:41) and dated at A.D. 1400-1500 (Stuart, et al. 1981:322) follows the Gran Quivira Focus. The type site (LA 2081) is located approximately one mile southwest of Pueblo Colorado. Tabira Black-on-white now appears along with glaze polychromes. In addition, Chupadero Black-on-white, Jornada Brown and Corona Corrugated are still in use.

The Pueblo Pardo Focus was defined by Toulouse (1960:41) and dated at A.D. 1500-1600 or 1650 (Stuart, et al. 1981:322). The type site is Pueblo Pardo, a major ruin three miles south of Gran Quivira. Although Chupadero Black-on-white is still in use, Tabira Black-on-white becomes the dominant Black-on-white ware. Jornada Brown is still present in the ceramic assemblage and a number of intrusive glaze wares are present.

The Salinas Focus in the historic period within the Salinas Province, defined by Toulouse (1960:41) and dated at A.D. 1600-1675 (Stuart et al. 1981:322). This includes the pre-rebellion mission period of the area. Ceramics include Spanish-influenced pottery styles of Tabira Black-on-white; Tabira polychrome makes its appearance, and late glaze wares predominate the ceramic styles. Large masonry pueblos are the norm.

BRIEF REVIEW OF ARCHAEOLOGICAL INVESTIGATIONS AT GRAN QUIVIRA

During 1923-25, E. L. Hewett excavated part of Mound 15, a Kiva, and San Buenaventura. Because the monument was a relatively new national monument, the main purpose of his work was to gather information on the site and to stabilize and clear the church for visitor enjoyment. In 1923, approximately 50 skeletons were taken out of the burial ground, Kiva No. 1 was excavated, and part of the boundary was fenced. The custodian residence was built in 1925. Hewett best sums up his work on the church as follows:

> In the excavation of the mission church (1923-25), I was assisted by the late Mr. Frank Pinkley of the Park Service. The nave, chancel, baptistry and sacristy were cleared. The major part of the monastery was uncovered, disclosing the usual plan of patio, cloisters, refectory, living quarters, and corrals. The stone pavement in front of the auditorium was discovered in 1924. The repairs were made by Sam Hudelson of the State Museum in his usual capable way. The walls were put in condition to resist further deterioration.... (Hewett 1943:235-236).

In September, 1924, Wesley Bradfield continued the work Hewett started the previous year. He extended the excavation in the large mission and cleared an additional seven rooms in a house block (Pinkley 1924). From March 1924 until the end of May, 1927, Mr. Pinkley and Mr. J. H. Jackson brought in 35 vigas for the new museum roof which was located west of the Porters Lodge, on the south side of San Buenaventura (personal communication, Tom Carroll). May 30 through

July 20 was spent cleaning the debris from rooms adjacent to Mission San Buenaventura.

In 1926, Odd S. Halseth placed test holes west of the church, southeast of the church, north of the church, and one near Kiva No. 4. In addition, Kiva No. 4 was partially excavated.

In 1940, Joe H. Toulouse, Jr. stabilized part of San Buenaventura and its convento, which included repair and stabilization of the corral, flagstone flooring of the porch and rooms 8 and 12. Before and after photographs were taken and record sheets kept.

During March through May, 1951, Gordon Vivian excavated approximately one half of House A, Kiva D, and conducted excavations/stabilization in San Isidro. Vivian's choice of House A and Kiva D for excavation was based upon the fact that these were, at that time, clearly on Federal and not state land. "The work at the small Mission, San Isidro, was undertaken primarily to preserve the remains of a badly vandalized ruin filled with the detritus of mining operations" (Vivian 1964:5).

Richard M. Howard planted an experimental plot of modern Indian maize at Gran Quivira in 1958. Location of the garden plot is not given. Howard (1958:2) demonstrated that two

harvests per year could be obtained; one in the spring and one in July.

In November and December, 1959, Richard M. Howard conducted test excavations in the present residential area before construction work on the houses was to take place. A two-page summary and two pages of photographs constitute the total report. Evidently, several test trenches were dug. No mention is made of how many or their depth. One test trench under the western residence uncovered a small room, a "flagstone terrace," and numerous sherds of Jornada Brown and Chupadero Black-on-white. The contractor, while digging the foundation of the western residence, uncovered two burials.

Residence construction was approved because of cold weather and frozen ground, with a recommendation that further excavations in the area take place in warmer weather. Further excavations in conjunction with the construction of the area never did materialize when the weather warmed up until 1964.

During April through July, 1962, C. B. Voll and Roland Richert conducted excavations in the Mission of San Buenventura. "The 1962 excavations were intended to reveal additional information concerning the completion of the church and whether or not a Kiva lay underneath the convento garth" (Voll and Richert 1962:3).

Although there is fragmentary historical and structural evidence to the contrary, Voll and Richert (1962:24) conclude that there was no archaeological evidence of a final and finished 17th Century floor in the church and that the Pueblo probably was abandoned before the interior of the church was completed. Archaeological testing in the middle of the garth revealed "that there was insufficient space for a Kiva and that none existed" (Voll and Richert 1962:36). Stabilization work was also performed in the excavation area.

During the summer and fall of 1964, Ronald Ice and Doug Scovill tested the hypothesis that many of the brownware and lithic scatters found at Gran Quivira and its immediate vicinity might possibly be pithouse sites.

> Two pithouses and four surface rooms were completely excavated and trenches were dug to determine the extent of surface structures. Two additional pithouses were located but not excavated (Ice 1968:1).

The five sites tested were GRQU 2, 5, 13, 14 and 16. Ice prepared a map indicating all of the GRQU site locations. However, neither Ronald Ice, the Monument staff, or the present author have been able to trace down the map's current whereabouts.

Alden C. Hayes conducted extensive excavations and stabilization of the Mound 7 Ruin during 1965-1967. Mound 7

is the largest of the mounds at Gran Quivira. This excavation helped to round out the ruins for interpretation. Previously the only stabilized portions of the ruins were the churches, the friars quarters, and House A. These areas alone gave a rather incomplete picture to the visitor.

The excavations at Mound 7 were the most comprehensive ones conducted at Gran Quivira and the Salinas Province to date. The resultant two-volume publication contains studies by seventeen individual authors on various topics from artifacts to highly specialized pathologies, thus giving the archaeological community a data base on which to do comparative studies within and outside of the Tompiro region.

On July 27-29, 1968, W. E. Sudderth and Claudia Kruse excavated a number of burials eroding out of the San Isidro Campo Santo. Two five-foot squares were excavated but exact provenience seems to be missing. Their report lists four adult burials and two infant burials (Sudderth and Kruse 1968:2) yet they list burials D through H (only 5 burials) and fail to mention A through C. If A through C are burials, that would bring the total to eight. They recommend that the entire Campo Santo be excavated. Because of Native American objections to the project, this was never carried out.

In 1974, Bruce Anderson excavated two test trenches northeast of San Buenaventura. These archaeological tests were

conducted for the new proposed visitor center at Gran Quivira in order to determine the extent of cultural resources in the immediate vicinity. Terracing was discovered in the test area.

During the present archaeological survey of the Monument, areas in which archaeological material had been dumped by previous excavations and maintenance activities have been identified within the field notes, assigned numbers, and their locations noted on the large aerial photograph provided to us by the National Park Service. This locational information is on file with the National Park Service.

TREASURE PITS AND SEEKERS

When the inhabitants of Gran Quivira and their Salinas relatives were driven from their homeland circa 1672, they most probably took refuge with their neighbors to the north and west. The Pueblo Rebellion eight years later drove these original survivors of Gran Quivira and their new hosts south to the vicinity of El Paso del Norte. Most of the present-day treasure seeking activity can probably be traced to these survivors. Vivian (1964:31) vividly describes the scene: "It's a delightful picture--the descendents of the displaced Jumanas selling treasure charts of Gran Quivira to gullible Spaniards." The tales of fabulous wealth buried beneath these ancient ruins undoubtly has hastened the demise

of Gran Quivira's two churches, San Isidro and San Buenaventura as most of the treasure tales involve the wealth of the friars or their hiding places.

In addition, there are several treasure seekers' pits and shafts to the east and southeast of the main Pueblo area. These have had major quantities of dirt and limestone removed and dumped adjacent to the excavation areas. All of these shafts go through the stratified limestone and into the underlying diorite. This is partly due to the fact that many of the early accounts state the treasure vaults were underground and their entrances were sealed. The nature of the outcropping bedding planes of the San Andres limestone almost looks like mortar and slab construction to the uninitiated, as Clara Corbyn implies:

> Removing this rock he found a curious formation. When the rock was shoved to one side, beneath this was a huge boulder which rested upon another flat rock and so on, the two alternating, four or five deep and no telling how much farther down into the depth of the earth, for Laurence wearied of the search and abandoned his unfruitful work at the depth of about ten feet from the surface. These rocks were, strange to say, laid with the regularity described, and in a bed of mortar which showed skillful handiwork (Corbyn 1904:368).

The treasure tales had already been present for many years preceding Carleton's arrival at Gran Quivira in 1853. Carleton (1855a; 1855b) makes many references to the treasure, its seekers and their haphazard diggings, on his way through the area, as the following illustrates:

> Here (Torreon) we learned that a small party of Texans had recently been at the ruins of Gran Quivira in search of treasures (Carleton 1855a:304).
>
> It seemed as if the genii who, in the Eastern tale at least, are said to guard the depositories of great treasures, were determined to make the existence of such a place as Gran Quivira as much of a problem to us as to the Mexicans themselves (Carleton 1855a:186).
>
> The most rational accounts represent this to have been a wealthy Spanish city before the general massacre of 1680, in which calamity the inhabitants perished--all except one, as the story goes: and that their immense treasure was buried in the ruins. Some credulous adventurers have lately visited the spot in search of these long lost coffers, but as yet (1845) none have been found (Carleton 1855a:190).
>
> In the cemetery of the great church, according to figure number one, there is a pit, and by digging will be found two bells. By taking a narrow street, leading in an easterly direction from the old church and the town will be seen a hill, at the distance of three hundred varas, more or less, and there is no other, which forms a line with the bells. On the side of said hill there is a pavement of ten yards or more, beneath which is the great treasure (Carleton 1855a:194).
>
> We find in the cathedral, and in the chapel, in every room of the monastery, in every mound of stones in the neighborhood, and in every direction about the ruins, large holes dug, in many places to the depth of ten feet, by those who have come from time to time to seek for these hidden treasures. Some of these holes look as if they were made more than a century ago, while others appear to be quite recent. Even the ashes of the dead have not been left undisturbed during these explorations. Near the east end of the chapel we saw where the people who had been digging had thrown up a great many human bones, which now lie scattered about (Carleton 1855a:194).

Cheney (1934:39) estimates the treasure at 1,600 burro loads of gold and silver, each burro load weighing 250 pounds, or

4,224,000 troy ounces. At today's market price of $540 per troy ounce for gold and $9.50 for silver, that treasure would be worth in excess of $540 million if it was half gold and half silver.

About 1900, a band of Brazilian gypsies under the leadership of La Cerda, came seeking a treasure worth $30 million which included a one hundred pound diamond. La Cerda claimed he had an aunt in Spain who had papers showing the treasure's location. His dreams were short lived as:

> ...The Count became embroiled in a fight over a lovely senorita in Tajique and landed in jail when it was thought that he had killed a Mexican boy. The boy recovered, however, and La Cerda's brother bailed him out of his troubles and took him back to Brazil (Anonymous 1970:1).

The first known treasure hunter appears to be a don Pablo Yrisarri "who began his probings at Gran Quivira in the 1780's after having come into the country by way of El Paso where he probably obtained his treasure chart" (Vivian 1964:31). Don Pablo's descendent, Jacobo Yrisarri, was still looking for the treasure when he was arrested and taken to Santa Fe in 1917 for violation of the 1906 Antiquities Act. The area was by then a National Monument and closed to treasure-seeking activities. However, a permit to excavate for treasure in 1930 was granted to J. B. Wofford and Alfred J. Otero, and to Otero again in 1932. This time it was Jacobo Yrisarri again working under Otero's permit and he

began to clean out his old shaft under the apse of San Isidro. The permit expired on December 31, 1933 and attempts at an extension and a new permit were denied. The National Park Service backfilled Yrisarri's shaft in 1940.

In the late 19th Century, another couple, Mr. and Mrs. Corbyn, left their imprints on the ruins of Gran Quivira. Having lost their fortune during a financial crash, they decide to return to New Mexico where they had first learned of the fabled treasure of Gran Quivira. They hoped that this vast treasure would return them to the affluence they had previously lost. The Corbyns filed for a 160-acre homestead on the site. After her husband died, the nearly blind widow, Clara Corbyn, continued her search for the treasure. The EL PASO HERALD reports in 1901:

> Mrs. Corbin (sic), who for years, with her husband, has searched for the treasure said to have been buried in the ruins of Gran Quivira in Lincoln county two hundred years ago by the Pueblo Indians, has returned to the Gran Quivira and has taken up her residence in the ruined church of that ancient and abandoned Pueblo village.
>
> She is accompanied by Harry K. Manikee and two other Washington men who will aid her in searching for the treasure. The search is made less difficult by the discovery of water at a depth of fifteen to twenty feet in that section and the filing upon nearby lands by homesteaders. Formerly the water had to be carried a great distance and there were no settlers for many miles around (THE EL PASO HERALD 1901:5).

Clara Corbyn's title to the north part of the ruins was validated by the Secretary of the Interior and it was not until her death that the School of American Research bought it at a tax sale in 1914, thus ending active unauthorized treasure hunting on the monument.

However, the treasure tales live on as the following illustrates:

> It is with great pleasure that I take my pen in hand to send you greetings now and to tell you news since you have probably heard mention of the old village of Gran Quivira the ruins of which exist at the present time. It has been said that there exists a great treasure buried by those who in former times lived in the above mentioned place. My friends and I, walking about this place found in a hidden spot a door that leads to an underground place made by human hands. This was covered with stone and earth which we removed and entered for as far as thirty feet but we were finally afraid it might sink and we left it. I, lacking the necessary elements for the enterprise, have been able to get my companions to agree to have join us an honest man so we may proceed with what we need. I have chosen you to carry out the enterprise. I am doing so because of memories of gratitude and appreciation or in other words because of past favors. If you would like to come here we will take you to the place I have mentioned. We have chosen you to be our companion to see that our interests may be protected. Trusting in God we shall have the best results possible. I am hoping for your answer as soon as you can conveniently make it (Garcia 1916).

Does the treasure really exist? Quien sabe! Men have schemed to get it and have died trying to reach it (Hood 1951:54). The nearest silver and gold is found around White

Oaks, New Mexico, closer to Tabira than Gran Quivira. Very little evidence was noticed on the survey of slag or firing activity needed for smelting. The pueblo was also abandoned before the Pueblo Revolt of 1680, so it is doubtful if the friars had left any church property or valuables. Any metal, even iron, was a scarce commodity in 17th Century New Mexico. But, the legend is a very real thing for many of the old families of the region and they take delight in expounding on tingling tidbits of the treasure tales to visitors who lend a willing ear to them.

REGIONAL SIGNIFICANCE OF THE ARCHAEOLOGICAL RESOURCE

Gran Quivira is one of the most important archaeological and historical large ruins in the Southwest. Gran Quivira, sometimes referred to as the Pueblo de las Humanas, has had a long history of occupations beginning perhaps in the 700's and lasting up until the 1670's, an occupation period of almost 1,000 years.

The Salinas pueblos played an important part in plains-pueblo trade relationships. Gran Quivira plus the other Salinas pueblos have the potential of contributing information on the border relations between the sedentary pueblos and the more nomadic plains Indians, namely the Comanche and Apache and their ancestors.

The southern Salinas pueblos are probably directly related to the Jornada Mogollon populations and they might be the direct descendents of some of the Jornada Mogollon groups. The early pithouses and ceramics point to a southern origin, and historically the Rayados (striped persons) of the southern Salinas were different than those of the northern area. Archaeologically, this needs to be tested by differences in the material culture remains between the northern and south ern Salinas area.

Stuart, et al. (1981) makes a case of the importance of determining if there are two distinct populations in central New Mexico (cf. Tainter 1981:Note 2). Stuart further states:

> Burial data from the Jornada Mogollon area should be compared with data from central New Mexico to determine if these were, indeed, Jornada Mogollon groups in this area. Comparisons with Plains Indians should also be undertaken, since other groups also called Jumano or rrayado by the Spanish were known to inhabit the plains east of Gran Quivira in early historic times. Quite possibly this faction of the population could be from the plains instead of the Jornada area (Stuart et al. 1981:325).

Within the Mounment, there are possibly six pithouse village sites, twenty one major mound areas, and two early historical Franciscan missions. In the current Gran Quivira interpretive program, they have stabilized two house mounds, two mission churches, and five kivas. Future expansion of the interpretive program should include one or two pithouses,

Mound 21 site (an early Glaze A pueblo), and a testing program of the major water control devices present in the form of holding ponds.

Later, during pueblo times, many of the traits exhibited by these southeastern pueblo dwellers appear to come both from the Jornada area south and from the Anasazi area found to the north and northwest of the Salinas. An admixture of these borrowed traits or the influx of new populations integrating into the existing populations base presents intriguing problems for future archaeological work.

With the arrival of the Spanish into present day New Mexico came European influence especially from the Franciscan friars who were looking for Christian converts and were establishing missions and visitas. Through the mission activities, Gran Quivira became a visita administered through the church at Abo and later became a mission church with a resident friar. Along with the church came the civil government headquartered in Santa Fe. The disputes between the Church and State during the 17th century caught the local populations in the middle of two unrelenting masters, both extracting tribute in the form of work and goods. This control, coupled with famine and increased Apache pressures, contributed in the 1670's to the end of a thousand years of occupation at Gran Quivira. Many of the newly introduced European traits were represented in the excavated ceramics from Gran Quivira.

Tabira Black-on-white shows up in mug and plate forms along with candlestick holders. Further excavation on some of the latter mound areas have the possibility of producing more evidence of European, pueblo, and Plains Indian material culture relationships.

The author is aware of the importance of interpretative programs in the management of cultural resources. In this section, the author has described some of the more important archaeological work that needs to be undertaken to allow such interpretations to be made. A more detailed set of recommendations regarding intrepretation of the site to the public can be found in Chapter Six.

CHAPTER FOUR

FIELD AND LABORATORY PROCEDURES

FIELD AND LABORATORY PROCEDURES

FIELD PROCEDURES

Survey Methodology

The actual survey was conducted by walking parallel transects. The majority of the survey was done with only two individuals, Michael Taylor and the author, walking seven to ten meters from one another. On occasion we were joined by Thomas Carroll, superintendent of the Monument. On one occasion we were joined by Ronald Ice and Bruce Anderson, archaeologists from the Southwest Regional Office of the National Park Service in Santa Fe. The transects were either north - south or east - west, depending upon the area of the Monument being covered.

All transects were lightly drawn on the air photographs (9" x 9", provided by NPS) before the transects were walked. This procedure allowed one archaeologist to plot all artifacts and sites accurately on the appropriate air photograph, and allowed the other archaeologist to keep notes and double check locational data and direction orientation by compass. An additional check on transect location involved placing pin flags at the edge of the transect lines, a procedure that generally was not needed, due to the accuracy of the air

photographs. The closeness of the transects insured that visible features, structures, etc., would not be missed during the survey.

All sites and isolated artifacts were given field numbers. The term "isolated artifact" usually means one item of cultural material isolated and unrelated to any other artifact or activity area. In the case of the Gran Quivira survey, a different definition was utilized in the field. Isolated artifact numbers were given to single artifacts and areas of tremendous sherd concentrations. Sherd concentrations were included because in the immediate area of the main mound areas, and in other areas, parts of the Monument are a continuous sherd scatter that cannot be assigned to a definite mound area or single activity area. Many of the isolated small sherd scatters without evidence of some sort of activity were classified as isolated artifacts. In other surveys, without the high density of sites and features, the author would probably have classified these as sites.

The use of the term "site" was reserved for areas where features or structures were either present or suspected. The use of "site" in terms of some definitions (e.g. Cibola National Forest - two or more artifacts in close proximity to each other is classified as a site), would have produced thousands of sites at Gran Quivira and would have obscured

the meaningful occupation or major cultural activity areas, within the Monument. Many of my colleagues may take exception to my use of the term, but I contend that it was a useful and necessary one for this particular survey.

There were several sherd scatters that were called sites, even though no surface depressions or other features were visable. These areas had a large amount of Chupadero Black - on - white, Jornada Brown (local varient), and Corona Corrugated wares. In most cases, these were the only or at least the major ceramics located on the ground surface. These areas were all found on benches overlooking parts of an adjacent valley. Site areas and specific artifact concentrations were all very similar to the pithouse area adjacent to and under the Monument permanent residences and the buried pithouse village on Jack Kite's ranch northwest of the Monument. Therefore, the author suspects that at least some of these areas are buried pithouse villages, although no surface evidence exists, outside of sherds.

Air Photographs

The use of 9" x 9" aerial photographs of the Monument area greatly enhanced the ability of the archaeologists to pinpoint the exact location of all sites, features, and isolated artifacts. All cultural and some natural items were plotted in pencil on the 9" x 9" aerial photographs. These

locations were then transferred in India ink to a large (3' x 3') aerial photograph composite.

On the large aerial composite, all sites are designated by the letters "GQ - #" and are described in the site survey forms and sketches that are appended. All isolated artifacts are listed as Arabic numbers on the air photo composite and the field notes describe each isolated artifact (I.O.-#).

LABORATORY PROCEDURES

A small collection of sherds and projectile points were collected for lab analysis. These were given field numbers and were bagged. Toni Sudar - Laumbach and the author did the laboratory analysis of the collected material.

Mechanical Treatment

All collected sherds, lithics, etc., were washed prior to being numbered. All numbering was done with India ink and was sealed with clear fingernail polish. The collections are being returned to the NPS for storage.

Typological and Functional Analysis

The types and the functions of the various artifacts were determined in the laboratory. Sherds were analyzed for vessel form and typed where there were rims or enough design pattern to classify the sherd. Points and other lithic

materials were recorded as to material, type and culture where feasible.

CHAPTER FIVE

SURVEY RESULTS

SURVEY RESULTS

As every archaeologist knows, trying to reconstruct prehistoric settlement patterns, material culture sequences, and other culturally related activities and the processes of their evolution is a difficult job even when one excavates a site. When one endeavors to do it using surfacial evidence and artifacts it becomes a harder task, even when the site is in an undisturbed condition. The survey of the Gran Quivira Monument had a number of problems already built into it: extensive treasure hunting activities in the past; numerous expeditions and their unrecorded excavations and, more importantly, their unrecorded back dirt piles; monument staff trash areas; dumping areas of times long past; homesteading activities, and last but not least, probably two hundred years of picnicking, fires, and curio seeking. Analysis of surface material is shaky at best.

Prior to the implementation of the archaeological survey, conversations were held individually with Mr. Ronald Ice and Mr. Thomas Carroll regarding the mapping and identification of the major mound areas. Due to the tight budgetary constraints, it was agreed that the previous mapping and excavation of two churches and their related mound areas were

covered in existing reports and documentation. It was also felt that further recording and mapping of these mound areas would not be cost efficient and that the time and money available would be better spent in survey and recording of the rest of the monument.

The surveyors recorded 23 new sites (Figure 11; Table 2) and 859 isolated occurrences. Site survey forms and site maps were prepared for all sites. Specific site locations and site maps are not included in this report, as per the contracted scope of work. The specific site forms, data and maps are on file with the National Park Service, Southwest Region. Some of the non-locational site material is incorported into this section.

BACK DIRT

There are a number of areas within the monument where archaeological back dirt has been dumped. Many of these areas contain the same vegetation (saltbush and cholla), found only on the mound areas and their closely related environs. This vegetation identifies disturbed areas and these areas are visible on aerial photographs of the monument. We identified on the aerial photos all of the areas that appeared to be back dirt. In many cases, Mr. Vernie Wells or Mr. Jack Kite kindly told us that they were present when the back dirt material was placed at their

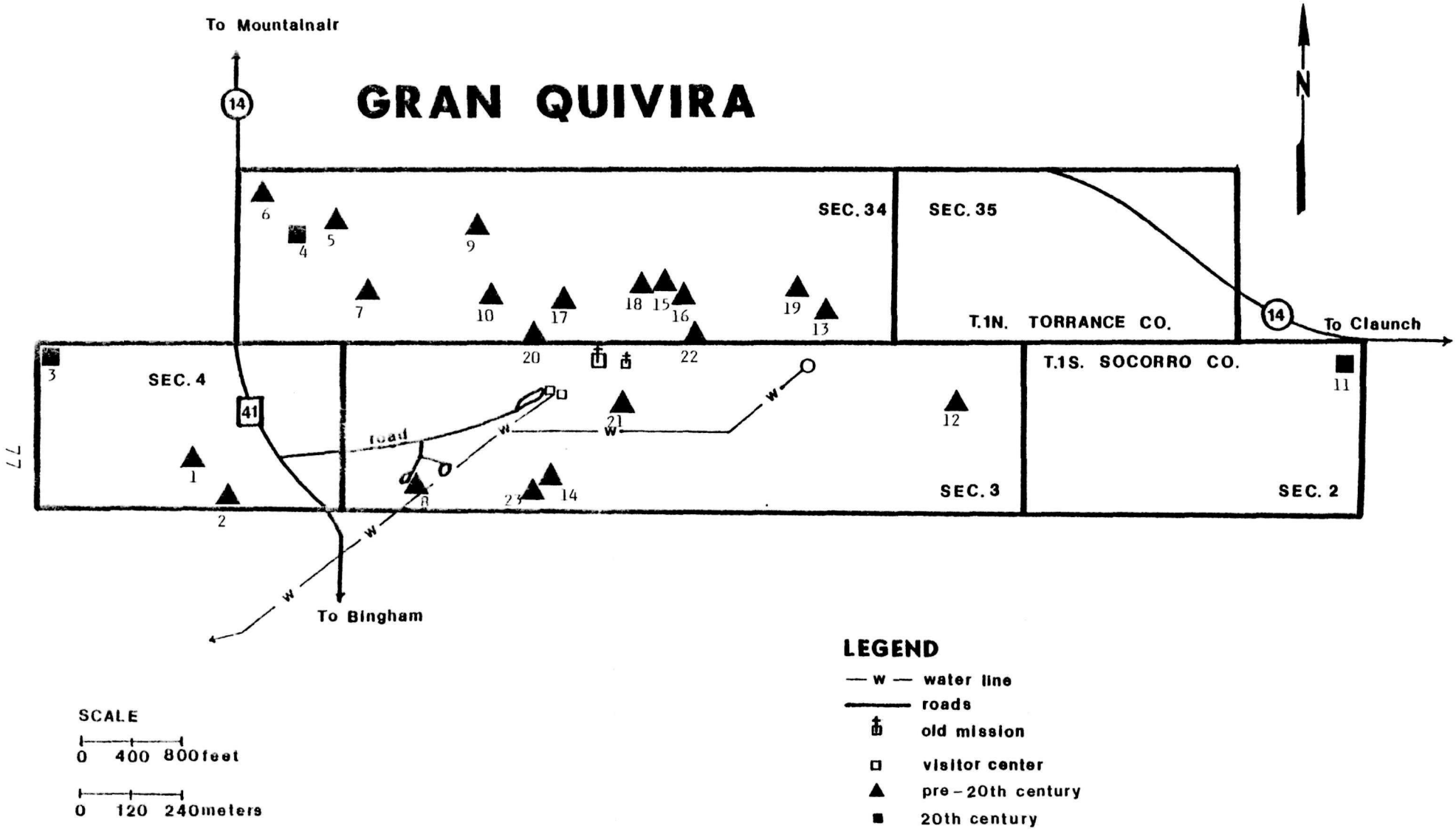


Figure 12: Archaeological Sites Recorded. Numbers Refer To GQ Site Numbers.

Table 2: Archaeological Sites Recorded at Gran Quivira National Monument*

Site No.	Type	Date (A.D.)	Size (in meters)
GQ- 1	Hearth with association artifacts	?-1672	12 N-S; 10 E-W
GQ- 2	Hearth with association artifacts	?-1672 1930-1940's	20 N-S; 10 E-W
GQ- 3	Probable historic homestead site	1910-1925?	40 N-S; 50 E-W
GQ- 4	Old well	?-1672 1901-1914?	30 N-S; 30 E-W
GQ- 5	Large sherd scatter with possible buried features; sherds span entire sequence	?-1672	40 N-S; 100 E-W
GQ- 6	Large sherd scatter with possible buried features; sherds span entire sequence	?-1672	150 N-S; 200 E-W
GQ- 7	Single structure (pithouse?)	1050-1300	16 N-S; 20 E-W
GQ- 8	Large pithouse village	1050-1300?	75 N-S; 200 E-W
GQ- 9	Probable pithouse village	1050-1300	80 N-S; 100 E-W
GQ-10	Large sherd scatter with possible buried features; sherds span entire sequence	?-1672	60 N-S; 120 E-W
GQ-11	Historic Beatty homestead	1920's	50 N-S; 60 E-W
GQ-12	Hearth with associated artifacts	?-1672	10 N-S; 10 E-W
GQ-13	Ponding area	?-1672	30 N-S; 30 E-W

Table 2 (Continued)

Site No.	Type	Date (A.D.)	Size (in meters)
GQ-14	Probable pithouse village	1050-1300?	60 N-S; 50 E-W
GQ-15	Prehistoric dam	?-1672	30 N-S; 15 E-W
GQ-16	Small dam plus Hewett's burial pit	?-1672	35 N-S; 25 E-W
GQ-17	Small rock mound	1300-1672	16 N-S; 22 E-W
GQ-18	Series of terraces	?-1672	80 N-S; 60 E-W
GQ-19	Dug out depressions with small wall	?	15 N-S; 10 E-W
GQ-20	Small rock mound halfway encircled by ditch	?	28 N-S; 38 E-W
GQ-21	Possible pithouses	1050-1300	20 N-S; 20 E-W
GQ-22	Five large holes	?-1672	35 N-S; 30 E-W
GQ-23	Pithouses	1050-1300	75 N-S; 60 E-W

*Site forms and maps are on file at the National Park Service, Santa Fe and Gran Quivira.

current locations. We felt that this information needed to be recorded as many of the dump areas were already beginning to look like mound areas themselves, complete with sherds and artifacts. The locational information and descriptions are on the aerial photographs and field notes filed with the National Park Service. This includes locational information where prior archaeological projects placed their backdirt.

NON-INDIGENOUS GRAVEL

There is a large amount of non-indigenous gravel located approximately 50 meters south of the western permanent residence. The gravel is left over from the construction of the permanent residences. This gravel has a lot of complete quartzite cobbles that are of hammerstone size and quality (none have been utilized) and is from the same source as that found on the roadway west of the maintenance center. The quartzite cobbles could be confusing to future archaeologists as the cobbles are in the area of Site GQ-7 and are settling into the aeolian deposits.

SHALLOW PITS BY MONUMENT WATER TOWER

There are a large number of shallow depressions dug into the limestone outcrops east of the main Pueblo area. These depressions have been explained in a number of ways over the years as water catchment basins, food processing pits, quarry areas, pottery firing areas, and treasure pits.

Evidence points to most of these being limestone quarry areas that were then utilized as farming plots. This hypothesis is based on the following:

1. Water catchment basins: some of these depressions are so located (e.g. on top of a knoll) that the only water trapped is direct rainfall and a very small runoff

catchment, certainly not enough to pond water for storage.

2. Pottery firing areas: the pits are in close proximity to a large arroyo where diorite is eroding out of the arroyo sides. This material is one of the tempering materials utilized in some of the local pottery. The possibility exists that some of these depressions might have been utilized as pottery firing areas. However, there is little evidence of fire-burned limestone which should be in the area if there were fires in these depressions.

3. Food processing pits: the possibility exists that a few of these might have been utilized in the same manner the Apache utilized pits for their mescal processing and the Apaches were no strangers to the inhabitants of Las Humanas. Still, the same lack of fire-burned limestone suggests other usages for these pits.

4. Close examination of these shallow depressions by Dr. Weber (senior geologist, Bureau of Mines), Dr. Clauter (geophysicist, New Mexico State University), and the author, revealed that the majority of them have several common characteristics which include: no building size limestone is present; only small limestone fragments are present, most of the small fragments are

piled on the downslope side of the depression; most depressions occur at natural outcrop levels; most appear to have been excavated by digging in from the natural outcrop bedding plane, and working into the side of the hill; and the depressions could not be filled up by their surrounding limestone fragment berms. These characteristics mean quarried material was removed from the area. Thus, they are probably not treasure seekers' holes and are most likely to be quarry areas.

Small test pits were placed in two of these depressions to see if bedrock was close to the surface of the depressions. Good dark soil and small limestone fragments were encountered in both test pits. It is unlikely that the soil deposit is the result of aeolian activity as in all other areas of the monument where the aeolian deposits are quite sandy. It appears that soil was intentionally placed in these old rock quarry depressions and that they were then used for farming with some water catchment from the surrounding hillside. The small limestone fragments were probably intermixed with the soil to increase moisture retention in the soil, a practice utilized by some southwestern Indians.

LARGE PITS

There are a series of five large holes (Site GQ-22, Pits 1-5) or pits dug into the limestone between the monument water

tower and the main mound area. The largest pit, Pit 1, is 6.6 meters in diameter and 3.6 meters deep. The sides are somewhat irregular I calculated that the hole would hold 123 cubic meters of fill. The earth berm on the pit's edge is very irregular and is comprised of large pieces of limestone and earth. I calculated that this berm held approximately 117 cubic meters of material. According to Maintentance Foreman Vernie Wells, part of the berm had been removed by the National Park Service in the past for fill. The old berm outline was still visible and was used in the berm calculations.

Since the berm held enough material to fill the pit and the berm also included large limestone rocks, it is suggested that this pit was not a quarry pit but was probably a treasure-seeker's hole. The hole is currently a rattlesnake den, so no attempt was made to test the bottom of the pit for fill.

Pit 2 is a large shallow pit adjacent to Pit 1. It appears as if this pit, 10 by 14 meters, was excavated for fill as no fill remains on its edges. Even if limestone quarrying took place, there should be small pieces thrown aside along with dirt. It could possibly be a modern borrow pit.

Pit 3 is a smaller version of Pit 1 and has a berm around its edges. It looks as if it is another treasure-seeking pit, complete with a modern rattlesnake den.

Pits 4 and 5 are very similar to those found on the hill next to the water tower. These appear to be old limestone quarrying pits.

Three holes near Mound 21 are rather irregular and deep. These go all the way through the limestone strata into a diorite stratum. There is some loose material beside some of the holes but not enough to fill them. These are possibly small quarry areas or (?).

EARLY WATER SYSTEMS

With the exception of treasure tales, nothing has attracted more attention to Gran Quivira than the apparent lack of permanent water. The only water available to the early visitors of the area was snow or a small playa one-half to three-quarters of a mile to the west of the ruins. This lack of permanent water probably prevented the total destruction of the pueblo and its two churches by treasure hunters. From abandonment until the advent of the 20th century, the closest known permanent water was a spring at Montezuma Ruins about six miles to the west and a permanent spring in the Gallinas Mountains about fifteen miles to the east.

Various authors in the past have referred to elaborate water systems for the pueblo. As early as 1844, Gregg states:

> What is more extraordinary still, is, that there is no water within less than some ten miles of the ruins; yet we find several stone cisterns, and remains of aqueducts eight or ten miles in length, leading from the neighboring mountains, from whence water was no doubt carried (Gregg 1954:117).

Gregg's (1844; 1954) observations are generally reliable and accurate, but no evidence exists for the aqueducts that he cites. It is assumed by this author that Gregg was relying on verbal descriptions by other travelers in the area -- perhaps the verbal testimony of Benjamin David Wilson, a trapper, who visited Gran Quivira about 1835. Wilson had been without food or water for almost a week and did not find water at Gran Quivira, but "...discovered on the eastern side what satisfied me were the remnants of a concrete aqueduct. Camped there that night, next morning endeavored to trace the aqueduct, which led easterly to a mountain range" (Woodward 1934:95-96). He undoubtedly found the springs in the Gallinas which were the primary sources of water for those treasurer seekers at Gran Quivira until water was obtainable at the foot of the Gran Quivira hill at the turn of the 20th century.

> We were informed by men at Manzana who had been pastores in their youth, and had herded sheep in this region of country, that there is a fine, bold spring of water at the base of the Sierra de las Gallinas, about fifteen miles from the ruins; and

> that they had heard that water once ran in an aqueduct from the spring to the Gran Quivira. This could hardly have been possible unless the aqueduct was a closed pipe; because from appearances the country intervening between those two points is considerably lower than either of them (Carleton 1855a:189).

The aqueduct that Wilson and Carleton referred to was probably a well worn abandoned roadway that ran easterly from the top of the Gran Quivira hill. Carleton describes the scene:

> Toward the east we saw a well defined road, which kept the ridge for a few hundred yards and then turned off toward the southeast, where all further vestiges of it are lost in the sand. Where it is the most plainly marked along the summit of the ridge some large cedar trees are growing directly in the middle of it. These trees look to be very old indeed (Carleton 1855a:188; 1855b:308).

Later Bandelier and Toulouse describe the short portion of this prehistoric roadway as an irrigation trough or ditch. The ditch hypothesis does not seem valid because, given the local topography, water would have to run uphill in several places. Howard, in 1958, cut a test trench across one of the most prominent troughs in order to test the irrigation ditch hypothesis.

> There is no indication that the trough was in any way intended for the flowage of water. The trough has no clay or rock lining, nor is there any soil stratification as evidence of past water flowage. The surface of the bedrock is very irregular, with many small cracks, and had not been previously disturbed. This situation--loose soil, underlain within a few inches of the surface by bedrock--has

> been encountered in other diggings on the Monument, and seems to be the normal soil profile of the area (Howard 1959a:88-89).

There are a number of definite ponding areas or catchment basins on three sides of the pueblo area. Historically, these dammed areas do not hold water for any great length of time. Dr. Robert Weber, Jim Trott, and the author, attempted to auger test the best defined of the basins (Site GQ-13). It was impossible to auger beyond 10-15 centimeters depth due to the high clay content and compactness of the basin bottom. The sides of this basin are littered with sherds from all periods of the pueblo occupation.

PREHISTORIC DAMS

There are two prehistoric or early historic dams (Sites GQ-15; GQ-16) built on the same drainage system approximately 250 meters northeast of San Buenaventura. Both of these dams have a small ponding area. Site GQ-15 is a better defined structure and is constructed of large limestone rocks and earth. It has stood the test of time very well. The catchment basin is heavily silted and the sides of the sloping arroyo are littered with sherds and some lithics.

Site GQ-16 appears to have been an earthern dam but it contains recent backdirt on its southwest and northeast sides. This backdirt is probably from Hewett's early excavation pit, located to the south of the holding pond.

Table 3: Major Water Holding Areas*

Site	Approximate Holding Capacity
GQ-13	39.250 cubic feet
GQ-15	10,500 cubic feet
GQ-16	7,900 cubic feet

*One acre foot = 43,560 cubic feet.

AGUA DE POSO (GQ-4)

Agua de Poso (GQ-4) is a large depression and adjacent mound that was probably a historic well. Mr. Montgomery (now deceased) told Vernie Wells that the depression was a well in 1914 when he filled his car radiator there. This could also be the "spring of living waters" that Clara Corbyn describes:

> On the sixteenth day of January (year not given), two old men -- brothers -- uncovered a small spring of water near the foot of La Gran Quibira (sic) hill. This created a great sensation and the Ledington brothers were the heros of the hour (Corbyn 1904:370).

This is probably the new well that the "El Paso Herald" referred to in 1901, when it mentioned Mrs. Corbyn's planned trip to Gran Quivira.

The small mound area to the north of the depression could possibly be the ruins of some historic structure that was in

association with the well, or the fill that was removed from the depression.

TERRACE SYSTEMS

There were four definite terrace systems observed during the survey. Two large terrace systems are found north of the main mound area. The largest of these two is site GQ-18 which has a series of five rock retaining walls and a strange rock and earthen berm that merges into the mound areas to the south. This terrace system is bounded on the north by what appears to be a prehistoric road. The smaller northern terrace has a number of Glaze IV rim sherds in its center. The northern edge of this terrace is a meter high in spots.

Two of the smaller terrace systems are located west of the main mound areas. The ground surface in this area drops off rather quickly to a northeast-southwest arroyo. One of these small terraces, west of San Buenaventura Church and the monument service road, appears to have rock terracing across the arroyo and embankments. The extent of this system is hard to map as the area is intermixed with modern rock dump areas, probably from the early (1920's) church clearing operations. The other western terrace is comprised of an earthen berm that appears to be a part of an old terrace system.

MODERN SOIL EROSION DAMS

There are a series of four small modern dams built to check arroyo cutting just west of the north-south dirt road that cuts through the middle of the monument. The construction of these dams is somewhat similar. All have cedar posts driven down as pilings, rock and dirt fill with four-inch wire mesh or chicken wire. Each dam is slightly different from the others. See the FIELD NOTES for more detail.

PITHOUSES

Pithouses have been known to exist within the monument for many years. Richard M. Howard (Howard 1960b) did a few test excavations in the area where the permanent housing was to be built and found the possible remains of a small room and postholes; two burials were also uncovered during the building construction when the residences were built.

In 1964, Ronald Ice and Doug Scovill (Ice 1968) excavated two pithouses and several surface rooms, and located two additional pithouses. Two of Ice's pithouses, rooms (GRQU #2) and Howard's room are located within Site GQ-8. In addition, there seems to be another pithouse near the site stake. The limits of this site have been extended to include the two permanent park residences. One meter of aeolian sands covers a large part of this area, obscuring subsurface remains.

Site GQ-23 (Ice's GRQU #14?) was a disturbed area with a slight mound. There are a small number of Chupadero Black - on - white, Corona corrugated and red glaze body jar sherds in the area. There are two small disturbed areas to the north and northwest of the mound that appear to be old test trenches. If this is Ice's GRQU #14, then it has at least two pithouses and a surface structure in association. There is no surface evidence at present that would indicate structures. Ice's comment would also substantiate this: "The only surface indications were a few scattered sherds and stone flakes" (Ice 1968).

Site GQ-9, 400 meters northwest of the main mound area, and Site GQ-14, 165 meters south of the visitor center, appear to be pithouse villages due to the nature and ceramic types of sherd scatter. GQ-21, south of the major mound area, might be a possible small pithouse site, at least there are early sherds in the area. Site GQ-7, 550 meters west-northwest of San Buenaventura, appears to be a single pithouse or the remains of an early surface room. No testing was done in these areas for pithouses or walls.

The number of pithouses located within the monument was a surprise. These pithouses, coupled with the large pithouse village on Jack Kite's property northwest of the monument, give a sizeable early population for the area. There are also a lot of early brownware sherds eroding off of the trash

areas from the major mound areas. Some of the mound structures might be built on old pithouse areas.

MOUND AREAS

As stated earlier, nothing was surveyed for the twenty-one previously recorded mound areas. One new small mound was recorded, Site GQ-17, located just west and adjacent to the monument service road. It is a small, low-lying mound. Out of the many glaze ware sherds, only one rim sherd was assigned to Glaze III.

At first glance, one area (Site GQ-20) looks like a small mound area. An elevated rock mound rubble area surrounds a rather large cresent-shaped depression. The depression looks as if it might have been excavated by a bulldozer. There are a number of sherds in its northwest corner. The function or nature of the site is not known.

HISTORIC RESIDENCES

There are two historic homesteads within the monument boundary. In the northeast corner of the monument is the old Beatty homestead (Site GQ-11). No trace of the house remains, but trash, corrals and a cement-lined well attest to the location.

In the northwest corner of the monument is another old homestead site (Site GQ-3). Its previous occupant is not known at this time, but the site was probably abandoned by the Middle 1920's, judging by the trash. An old stove is stamped "Mar 18" on two leg parts.

In addition to the two old homesteads, Mrs. Clara Corbyn and her husband filed a homestead on the ruins proper and she lived for a while, after his death, in the Mission San Buenaventura.

PREHISTORIC AND EARLY HISTORIC ROADS

An attempt was made to locate early roads on the monument. Carleton (1855a&b) described an old road leading east out of the mound areas (see IRRIGATION SYSTEMS, this chapter, for quotation). An old road appears to also run east-west, adjacent and south of Site GQ-18, and limestone rocks between the terrace and the roadway have petroglyphs.

Three definite road cuts were also recorded, and plotted on the aerial photos. It is not known if these were prehistoric or late 19th - early 20th century road cuts. The old monument road abandoned in 1960 was almost impossible to detect in some spots due to new vegetation and aeolian activity.

There is a good possibility an old road existed between Pueblo Pardo and Gran Quivira, although no traces of this road were observed within the monument boundary. Aerial photographs indicate a clear road alignment between these two sites outside of the monument boundary and was verified on the ground by Mr. Carroll.

MATERIAL CULTURE

Isolated artifacts were recorded during the course of the survey. In areas of heavy sherd and lithic scatters (e.g., next to the major mound areas), no attempt was made to count or record all artifacts and sherds, but simply to define the scatters and note their approximate density as they often numbered in the thousands. The material culture sections of Vivian's (1964) and Hayes' (1981) reports on their excavations at Gran Quivira were consulted. In addition, Toulouse and Stephenson's (1960) report on Pueblo Pardo (three miles south of Gran Quivira) was consulted in respect to lithic material.

The abundance of limestone fragments throughout the survey area probably obscured many other limestone artifacts. The natural weathering processes of knapped limestone artifacts also contributed to the difficulty of visual identification. The general lack of lithics outside of the mound areas surprised the author. Discoidal disks were by far the most

numerous artifact type located and recorded during the survey; all were made out of local limestone (see Appendix A for a thorough description).

Table 4: Lithic Material Types for Knapped Artifacts Found Outside of the Major Mound Areas

Material	Chert	Chal-cedony	Lime-stone	Quartz-ite	Obsid-ian	Petfd. wood	Ba-salt	To-tal
Points		3	1	2	2		1	9
Preforms	1		1	2				4
Stone Tinklers				1				1
Hammer-stones			2	1				3
Choppers				1				1
Scrapers	2	1	1	1				5
Folsom End Scrapers	1							1
Spokeshaves	1							1
Blades		1						1
Cores		1	3	1				5
Retouched Flakes	2		1		1			4
Utilized Flakes		2				1		3
Unutilized Flakes	1	14	1	17	1	1		35
Discoidals			19					19
TOTAL	8	22	29	26	4	2	1	92

Projectile Points

The survey yielded nine (9) projectile points or fragments. The most common (5) were the side notched basal indented arrowpoints. Two specimens were corner notched arrowpoints. One was a basal indented base fragment, shape not determinable. One large basalt dartpoint located by Thomas Carroll was most unusual; its point and lateral edges almost appeared ground or well rounded from wear. The side notched

and corner notched points are represented in both Toulouse's (1960:31) and Young's (1981:109) reports. The side notched form is slightly different from Van Valkenburgh's Figure 48c (1964:135).

Preforms

A preform is a larger, unfinished, unused form which would appear to be in the last stages of production of a particular artifact type. A preform also exhibits many of the attributes of the intended artifact.

Four preforms were recorded during the survey. Three were bifacially flaked, leaf-shaped preforms. All three were biconvex in cross-section. One quartzite preform reduced from a flake was plano-convex in cross-section, bifacially flaked, and exhibited serrating on one edge. This one preform might have been used as a knife but utilization was not apparent.

Toulouse (1960), Van Valkenburgh (1964), and Young (1981), do not list preforms in their artifact inventories. However, many in Young's (1981:108-110) hafted knife and un-notched knives categories are probably preforms.

In such a large inventory of excavation materials as those produced by the Mound 7 excavations, it is unthinkable that there were no preforms. It is hard to tell from Young's

(1981) description, as the letters he refer to on Figure 133 are missing (two items in the top of the figure appear to be preforms). In addition, Young's (1981) unhafted knives a-c, Figure 134 appear to be preforms. The assumption is made that Young lumped preforms into the knife category as they were usually bifacially flaked.

Stone Tinklers

One possible broken stone tinkler was collected. At the time of collection, it was recorded as a drill. The specimen is well rounded and almost smooth. If the item was used as a drill rather than a tinkler, it would have been totally useless in its later stages as it was too smooth to have worked as a drill before it was broken.

Tinklers are not represented in Toulouse's (1960) or Van Valkenburgh's (1964) reports. Young does describe and illustrate these in the Mound 7 Excavation Report:

> Flake scars and the marks of carefully executed allover fine-chipping are dulled and rounded over with some areas lightly polished. Close inspection of the surfaces suggests that the finish is at least in part the result of much handling, long use, and perhaps some grinding, either by intention or during use (Young 1981:128).

Hammerstones

Three hammerstones were observed and recorded. Two were limestone and one was quartzite. The specimens were roughly

spherical in shape and all exhibited bruise or crushing marks on their edges. It is surprising that two were made out of limestone due to the nature and softness of the material.

Mound 7 comparison: Young (1981:108) reports that 893 were analyzed and 45 percent of that total were made out of limestone. Limestone appears to have been extensively utilized, probably due to its abundance in the area and the scarcity of the various types of harder cryptocrystalline quartz (e.g. chert, chalcedony, etc.).

Choppers

Only one quartzite chopper was observed. It was bifacially flaked on the distal end, and only 45 percent of the cortex was present. The specimen exhibited bruise marks (edge damage) on its bifacial edge.

Mound 7 comparison: One hundred fifty-nine of the 170 choppers recovered from Mound 7 were analyzed. "...Although most are limestone, some are quartzite and sandstone, and there are two or three each of chalcedony, chert, felsite, jasper, and schist" (Young 1981:105).

Scrapers

Five scrapers were found, and all are unifacially flaked and retouched along one edge of the flake. Four of the five

specimens are side scrapers and one is an end scraper. All specimens are plano-convex in cross section.

Mound 7 comparison: Young describes the "...374 unhafted scrapers. All have unifacially chipped or flaked edges and in most instances, the edges are deeply beveled" (Young 1981:111). Toulouse (1960:29) lists two side and two snub-nose end scrapers from his Pueblo Pardo excavations.

Folsom End Scraper

The earliest archaeological artifact recorded and collected was a Folsom end scraper. The convex end scraper has a steep angle of retouch on its distal end. The material is a fine chert and exhibits features which are characteristic of Folsom end scrapers. Judge describes its modification: "The distal end is modified by soft hammer retouch into an arc-shaped working edge, transverse to the main axis of the scraper" (Judge 1973). These scrapers sometime exhibit small gravers on one of the lateral edges. Nothing else was in asociation with the scraper and it is not known whether it was in situ or was a discard picked up by later inhabitants or visitors to the area.

Spokeshaves

One chert spokeshave was found within a disturbed area, possibly an old test trench. The specimen was made out of a large flake which had a unifacial concave scraping edge

formed by a flake removal. This concavity also shows usage striations and rounding. Adjacent to the concavity is a graver projection which also displays rounding due to usage.

Mound 7 comparison: Six shavers (spokeshaves?) were recovered. Young describes these as: "...an artifact whose working edges are sharp, bifacially chipped, and concave -- was perhaps used somewhat like a drawknife in the smoothing and shaving of shafts" (Young 1981:112). None were reported in the Pueblo Pardo report by Toulouse (1960).

Blades

One chalcedony blade was recorded. The blade was triangular in cross-section, with no cortex present. Its length was greater than twice the width. No utilization or wear patterns were observable on its parallel lateral edges. Neither Van Valkenburgh (1954), or Young (1981), list blades in their lithic artifact inventory. This specimen might have fit into Young's (1981:138) category of Unused Flakes. Toulouse lists two blades in his excavation of Pueblo Pardo: A piece of limestone and a piece of micaceous schist, chipped along both edges, may have served as large blades (Toulouse 1960:29). Toulouse's blades do not appear to fall into the normal definitions for blades and could well be broken knives.

Cores

Cores are the residual remains or nucleus of lithic materials that have had flakes or blades driven off of the original cobble. Generally, no original cortex is present. Five cores were recorded, three of which were limestone. Young states in the Mound 7 report that: Eighty-eight percent of the 913 cores from the excavation are limestone. In order of decreasing frequency, the other materials are chert, quartzite, chalcedony, quartzite sandstone, basalt, felsite, flint, jasper, and quartz. Neither Van Valkenburgh (1954) or Toulouse (1960) list cores in their artifact inventory.

Retouched Flakes

There were only four flakes that had shown evidence of secondary retouching. All of the specimens were unifacially flaked but did not exhibit any usage or wear patterns.

Mound 7 comparison: There is no comparable category in the Mound 7 report although they might have been categorized within the Used Flake category.

Utilized Flakes

Three utilized flakes were recorded during the course of the survey. All were primary flakes, generally with some cortex, that showed evidence of utilization. These flakes had small irregular flake scars on their working edges. The small flake scars are the result of cutting or scraping activities

which causes small irregular chips to exfolite from the working edge during utilization. These specimens were viewed with a 10x hand lens. All the flakes showed some minute rounding, which could have been from aeolian abrasion or from usage.

Mound 7 comparison: Of the 3,445 flakes recovered, 434 had been used. "...Although most are jasper, obsidian or chalcedony, a few are chert, limestone, flint, and several less frequently occurring materials" (Young 1981:112).

Unutilized Flakes

Thirty-five unutilized flakes were recorded during the survey. This category includes nondiagnostic lithic shatter and primary flakes that were deliberate products of a reduction technique. There were no comparable categories in the Mound 7 report. These were either lumped into the Used Flake category (cf. Young 1981:112) or as waste material (cf. Young 1981:138).

Discoidals

For description and discussion, see Appendix A.

Manos

A mano is a round, oval or rectangular cobble or a small modified sedimentary rock, used as a hand-held grinding stone. The mano is used as the upper grinding stone in

conjunction with a metate as the lower stationary grinding stone.

Only four manos were recorded during the survey. The small number of manos might be attributed to the area's constant visitors for the last 300 years, since abandonment and the fact that manos were used intensively, and are still used by a small part of the local population, for grinding corn, dried chile, etc.

Two of the four were one-handed, bifacial sandstone manos with plano grinding surfaces. One specimen was a two-handed unifacial quartzite mano. The remaining specimen was a one-handed unifacial sandstone mano.

Both Toulouse (1960:25-26) and Van Valkenburgh (1964:129) indicate similar types. Young describes their variety and usage in detail (cf. Young 1981:116-120).

Metates

A metate is a large grinding stone upon which various materials are placed when being ground between the hand-held mano and the stationary metate. Thirteen metate fragments were recorded during the survey. Six of the thirteen were bifacial sandstone metate fragments with plano grinding surfaces. Four were unifacial sandstone metate fragments. three appeared to be quartzitic/diorite unifacial metate

fragments. Toulouse (1960:26) and Van Valkenburgh (1964:128) describe similar metates. Young, in the 1981 Mound 7 excavation report, describes these in greater detail (cf. Young 1981:113-116).

PETROGLYPHS

There are a large number of limestone rocks outcropping on the monument. All of the rock art recorded appears on the north side of the mound area.

The most common rock art or special use area are rocks with deeply incised lines, x's and +'s. There are at least 13 major rocks with the incised lines marked on them. These incised lines on the limestone outcrop are identical to those found on small slabs and described as abraders in the Mound 7 report. Young goes on to describe the patterning:

> Most of the 40 V-grooved abraders are fairly large pieces of limestone; only nine are sandstone. All of these abraders, which have V-shaped grooves several millimeters deep and several millimeters wide, were probably used for sharpening the points of bone and wooden tools. Perhaps sand or a sandbased slurry was placed in the grooves to serve as an abrasive.
>
> In several instances, the grooves appear to be patterned. The "design" noticed most frequently is the form of an "x," occasionally partially or completely enclosed with a circle (Young 1981:122).

Four large rocks have semi-linear rattlesnakes pecked into them. One limestone outcrop has two pecked square

rattlesnakes (simulating a coiled snake), and a rather long linear rattlesnake petroglyph. These are in association with five axe grinding surfaces. Outside of the lines, x's, and one small hand, the only identifiable petroglyphs are those of the rattlesnake or awanyu. This symbol was so widely utilized throughout the Southwest that comparative studies attempting to link other regions would be very tenuous.

There are a number of other limestone rocks that appear to have pecked designs in them, but these are so badly weathered that description is not possible. In addition, weathering of the local limestone produces fine linear cracks along natural cleavage planes. This phenomenon often is mistaken for incised lines.

There is a possible anthropomorphic pictograph on the south side of a large rock that is covered with incised lines. This rock overlooks a prehistoric dam area.

AXE SHARPENING AREAS

There were five large, immovable limestone rocks with thirteen indented axe sharpening basins formed from usage. All of these axe sharpening areas are found on the north side of the mound areas.

HISTORIC DUMP AREAS

Twenty-one isolated trash dumping areas were recorded during the survey. Most of the trash dumped in these areas seems to run from the late 1930's to the early 1950's. The majority of the dumps are small trash areas that were utilized by past Monument residents (NPS) and in some cases, from residents of the town of Gran Quivira before the Monument boundary was expanded; also in a few instances from the two homesteads recorded during the survey. One large dump appears to have been an archaeological field school dump, tentatively dated to Vivian's (1951) excavation in Gran Quivira. The approximate dates and descriptions of the trash are given in the survey field notes.

CERAMICS

Some type sherds were collected during the course of the survey. These sherds were typed by Sudar-Laumbach and the author. The sherds have been tabulated for easy reference for the reader. Type descriptions for sherds found in Gran Quivira are given in detail by Hayes (1981) and there is no need to redefine or duplicate those excellent descriptions.

The major difference between nomenclature is in the author's use of Jornada Brown, local variety and Hayes' use of Corona Brown. These two are synonymous in this report. The author

would have been consistent with Hayes' final report had it been available in published form at the start of the survey.

Table 5: Ceramic Types*

Type	Number	Number	Percent
Local Brown Ware		29	14.6
Jornada Brown (local variety)	15		
Corona Corrugated	14		
Local White Ware		52	26.3
Chupadero B/w	26		
Tabira B/w & Plain	18		
Tabira Polychrome	1		
Chupadero/Tabira	7		
Rio Grande Glaze Ware		110	55.6
Glaze A	4		
Aqua Fria G/r (A)	19		
Sanchez G/r (A)	2		
Rayo G/r (A)	1		
Glaze A/B	2		
Glaze B	5		
Largo G/r (B)	5		
Glaze B/C	4		
Glaze C	1		
Espinosa G/p (C)	3		
Glaze C/D	6		
Glaze D	4		
San Lazaro G/p (D)	9		
Glaze D/E	11		
Glaze E	8		
Puaray G/p (E)	5		
Kotyiti G/r (F)	1		
Salinas Red	1		
Glaze on red (unclassified)	19		
Intrusive Wares		7	3.5
Santa Fe B/w	2		
Tularosa B/w	1		
Puerco Reserve B/w	1		
White Mountain Redware	1		
Apache (?) Micaceous	1		
Unknown (badly weathered)	1		
TOTAL		198	100.0

*Found outside the major mound areas.

Hayes (1981:72) lists the start of Chupadero Black-on-white at A.D. 1175 and terminates it with the advent of Tabira Black-on-white in 1545. Hayes also states:

> The earliest sites on which Chupadero is found are surface pueblos of contiguous rooms made of coursed adobe blocks with small, unlined kivas or pithouses fronting them (Hayes 1981:71).

This appears to partially contradict Caperton's (1981:4) observations of pithouse occupation in the region to which he assigns a date of A.D. 800-1200, and in which Chupadero Black-on-white was in association with brownwares on those found in the southern portion of his archaeological reconnaissance of the Salinas region.

During this author's survey of Gran Quiviria and in some surrounding sites off the Monument, Chupadero Black-on-white found in close association with the local brown wares seemed to indicate pithouse structures or the possibility of pithouses. These sherd combinations, when appearing in quantity, were generally void of other ceramic types and appeared consistently throughout the areas of pithouse excavations at Gran Quivira and in eroding pithouses on nearby Jack Kite's property. Thus, it is this author's opinion that the starting date for Chupadero Black-on-white is earlier then A.D. 1175 as suggested by Hayes (1981:72). The dates (e.g. Morenon, Whalen, etc.) of a number of

brownware sites in the Mesilla phase of the Jornada Mogollon area are currently being pushed back considerably and, thus, the date of the early pure brownware pithouse sites in the Salinas region would probably be pushed back also. It would not be surprising to find that the first appearances of Chupadero Black-on-white in later pithouse villages predate Hayes' A.D. 1175 date.

As in the Mound 7 report (cf. Hayes 1981:91), Glaze A sherds made up the largest percentage of sherds represented. Glaze B and C were definitely a minority, with Glaze D somewhat more abundant. This could be due to the earlier glazes lasting longer in Gran Quivira or a population fluctuation.

ARCHAEOMAGNETIC SAMPLING

When the gas line between the permanent residences and the trailers was dug up for replacement, a couple of charcoal lenses were noted in the trench profiles. On March 28, 1981, Drs. Dean Clauter, NMSU geophysicist, and Robert Weber, senior geologist, New Mexco Bureau of Mines, and the author took archaeomagnetic samples of the major charcoal lens. It appeared that it might be in a disturbed area. Dr. Clauter ran the samples during the summer of 1981 and confirmed our fears that it was a disturbed area. No other areas were sampled for archaeomagnetic dating.

C H A P T E R S I X

RECOMMENDATIONS

RECOMMENDATIONS

The archaeological survey has provided locational data that will be useful to management in future land planning activities and land resource development. Almost any contemplated park improvements will have some direct impact on the cultural resources at Gran Quivira. In addition, there are a number of unique resources that need interpretation and preservation. It is hoped that this section will help in future planning activities for the monument.

FUTURE DEVELOPMENT

If large scale development is to take place (e.g. camping grounds, visitor center, etc.), the only area large enough to accommodate these activities, with minimal damage to cultural resources, is the area east of the north-south dirt road, cutting across the center of the monument. This area is relatively free of cultural resources and has only one historic site, the old Beatty Homestead (Site GQ-11). This site is located in the northeast corner of the monument and could easily be protected by additional fencing or mitigation. This area would be the most cost efficient one

to develop from a cultural resources viewpoint. It would require a new access road or paving of the existing dirt road.

The existing maintenance area and residential housing area is situated on or adjacent to a pithouse village and some poorly defined surface rooms. Further development in this area should be curtailed or, if development takes place, a very thorough testing and excavation program should be implemented before construction.

Area west of the Mountainair-Bingham Road: Although only three sites were recorded in this area (one historic, two prehistoric), test augering revealed heavy aeolian deposition. A fair number of sherds were recorded for the area, despite more than a meter of recent aeolian covering. It is assumed from this surface evidence, plus the exposure of sherds and historic material in arroyo walls 50 centimeters below the surface, that there is a considerable amount of cultural material buried beneath these recent sands, including a good possibility of buried sites.

Area north of NM-14: This area is a roughly triangular-shaped parcel of land bounded on the south by NM-14 and fenced on all three sides. A portion of this area is currently being used as the monument sanitary landfill. This area has several backhoe trenches running east-west, and

garbage is placed in the trenches and then is backfilled. The exposed trench walls were examined for cultural materials but the exposed stratigraphy was sterile. The only artifact found in this parcel was one unutilized quartzite flake.

This area could provide space for retention of the monument's garbage well into the next century. Surface indications and the few open trench profiles indicate that there are probably very few, if any, subsurface cultural materials or sites.

The current procedure of backfilling the backhoe trenches has, for the most part, restored the topography and vegetation of the area. This area is currently not accessable to visitors and because of the presence of open trenches, it is recommended that it should remain closed as long as the area is utilized as a garbage dump.

INTREPRETATION TO THE PUBLIC

In order for the public to fully appreciate the significance of the Monument, a number of projects can be undertaken. Some of these projects can be accomplished at a relatively low cost; others represent a long-term commitment to preservation and interpretation by the National Park Service:

1. Improve the quality of interpretive materials (signs, pamphlets). Two interesting questions to be addressed can be with relevance to present-day societies: What are

the reactions of indigenous groups when confronted by foreign influences? What is the magnitude of change in material items, social structure and ideology that results from such acculturative episodes? These questions can be addressed on two levels: Pueblo-Plains relationships and Pueblo-Spanish contact.

2. Improve the quality of museum displays at the Monument. It is recommended that at some future date, the materials stored at the Western Archeological Center be returned and used for interpretation and display. This would aid in the development of the proposed museum in Mountainair. The author, New Mexico State University Museum, the Museum of New Mexico, and others, can provide assistance in the interpretation of these materials.

3. Interpretive materials available at the Visitor's Center should include information that describes how the Salinas Pueblos were integrated into a sociopolitical system. The study of such systems is an important topic in anthropology and is one which needs to be brought to the attention of the public.

4. The efforts of the National Park Service in providing visitors with "participating" experiences should be expanded. Participatory archaeology is an important part of the interpretation of a ruin and an excellent way to make the public understand the resource. These

experiences might include the making of ceramics, knapping demonstrations, and the making of chipped stone tools or a self-test on architectual development (pithouse-jacal-masonry pueblo).

ARCHAEOLOGICAL TESTING

A future testing program, carried out by NPS or a contractor, could resolve a number of questions and hypothesis-testing of many of the auxiliary features found on the Monument. The reservoirs should be tested to record deposition and to determine whether or not they were caliche or clay lined for better water retention. Pollen samples should be taken from the soil within the catchment basins. There has been a suggestion in the past that these basins are in reality farm plots. If so, pollen samples would also help to substantiate or disprove the hypothesis.

The large number (48) of small pits located near the present monument water tower has also been the subject of much discussion (see SURVEY RESULTS). The author believes these were originally quarry pits that were reutilized as farming plots. One or two of these should be cross-sectioned with test trenches and pollen samples taken on the vertical face. If these were utilized as farming plots, the entire profile should show evidence of cultigens. The author seriously doubts that the current fill is from aeolian deposits.

The large, deep holes (GQ-22) have intrigued monument investigators for a number of years. These pits are currently denning areas for a variable rattlesnake population. Past monument superintendents burned these pits and tried to eliminate the rattlesnake population. Within the last few years, the government has investigated this problem more closely and has ceased in their large scale eradication attempts, implementing a study/control program designed to protect visitors to the site. Until the snake problem within these pits is eliminated, testing of the pit fill and the testing of the hypothesis that these are old treasure-seeking shafts is discouraged, due to the natural hazards at these pits.

Excavation/stabilization of the pithouse villages on the monument would give the visitor a greater appreciation of the architectual changes and time depth of the monument. Site GQ-14 south of the visitor center appears from the surface indications to be a pithouse village and would be a prime candidate for excavation and stabilization as it would be the most accessible to the visitor to the main monument area.

The development of the pithouse village (GQ-8) within the monument housing area is discouraged as it would probably interfere with the current maintenance activities and expose the maintenance and residential areas to the public.

Utilization of the site for interpretation would not be in keeping with the monument setting and the natural tranquility of the area.

The pithouse to pueblo development within the Monument has not been well understood locally, much less regionally. This pithouse-pueblo transition is one of the more intriguing problems within the region. Any pithouse excavated should have Dendro, C-14, Archeo-mag, and pollen samples taken where feasible. To date, the pithouse and later jacal structures have only been dated by ceramic cross-dating. The earlier brownware dates coming from the southern part of the state suggest that the same earlier dates might hold true for the Salinas Province. The author postulates that Chupadero Black-on-white is probably earlier than the A.D. 1175 date given by Hayes (1981:72). This hypothesis undoubtedly will be tested in future research and excavation results in the region.

Mound 21, a square ruin with an interior plaza, is one of the most intriquing ruins in the monument. Mound 21 is the type site for Toulouse's (1960:41) Gran Quivira Focus. Most of the sites that would fall into Toulouse's Gran Quivira Focus have been built on defensive ridges or knolls. The Mound 21 layout resembles a Spanish form. However, the sparse surface ceramics suggest a Glaze A occupation. If the mound is a Glaze A occupation, then it is one of the earliest pueblo

structures at the monument. If future excavations are considered at the monument, this mound should be given a high priority. It would also provide the visitor a view of early pueblo life. Limited excavation or extensive testing would solve many of the present temporal problems associated with the ruin.

COLLECTION OF OLD DUMP SITES

There are a number of small garbage dumps less than 50 years old totaling less than 100 items (see FIELD NOTES), each located on the monument. Many of these could be cleaned up by a systematic collection policy which would record the items and possibly accession some of the better objects into a permanent study collection. This approach is advisable due to the further deterioration of the metal objects which are now identifiable and are in some cases of museum quality (e.g. wagon wheel, old car side lamps, etc.). In addition, there are a number of complete bottles and jars made by companies that are no longer in existance.

This procedure would also restore the visual integrity of the area. These items are located for the most part in isolated dump areas and have no spatial integrity as the items were simply dumped there. Thus, the philosophy of preserving them in situ for future studies is not a viable concept.

SOME REGIONAL PROBLEMS THAT SHOULD BE ADDRESSED BY THE ARCHAEOLOGICAL RESOURCE AT GRAN QUIVIRA

Ceramics

1. Ceramic assemblages and dates for the pithouses present.

2. Intrusive ceramics present within the pithouses.

3. Temper sources for the brownwares and the early Chupadero Black-on-white, local or non-local.

4. Is the Agua Fria Glaze-on-red in Mound 21 locally made or imported? If imported, this could indicate a major influx of migrants into the region, or an early major trade network.

5. Is there a ceramic continuation from the pithouses present at Gran Quivira to Mound 21 (Early Pueblo)?

6. Care in ceramic analysis as to the possibility of Apache ceramics or artifacts in some of the late pueblos if they are excavated.

Architecture

1. Are the architecture features of the pithouses on the Monument more similar to the Jornada Mogollon of the south or the Anasazi to the north?

2. All earth disturbance activities should be closely monoitored. It is known that the Apaches traded at Gran Quivira but there are no known Apache camp sites on or near the Monument. Brief Apache camps would leave little material culture or architecture outside of possibly teepee rings, but if possible, these need to be documented.

3. There were 32 historically documented wells during the period before abandonment. Where are they and were they walk-in wells or perhaps lined?

Artifacts

1. Stone animal effigies seem to be found in the Jornada Mogollon area and in the southern Salinas area more than anywhere else in New Mexico. Are these effigies part of a regional clan system, influenced from northern Mexico and Meso-America?

2. The stone tinklers found at Gran Quivira are somewhat unique. What are their purpose?

3. Discoidal disks should be carefully recorded during excavation to show relationships with other artifacts and especially ceramics. The author's hypothesis on discoidal disks presented elsewhere in this report should be tested.

APPENDIX A

AN ALTERNATE HYPOTHESIS ON THE USE OF THE PLANO-CONVEX DISKS

AN ALTERNATE HYPOTHESIS ON THE USE OF THE PLANO-CONVEX DISKS

These circular flaked rocks are by far the most abundant lithic artifacts found on sites of this area. They have been referred to in the literature as discoidals, disks, plano-convex disks, choppers, scrapers, gaming pieces, tejas, and quoits.

The majority of these plano-convex disks are roughly circular in form. Some are bifacially flaked around the circumference but most are unifacially flaked from the plane surface, generally in order to improve the plane surface. Vivian (1964:132) states that "...the idea seems to have been to obtain a flattish undersurface and rounded perimeter, rather than a cutting edge. When the flat surface does meet the rounded surface with a sharp line, the flat surface shows natural cleavage planes, rather than retouching."

The lithic material of the disks seems to be directly related to local sources of sedimentary rocks. Abo and Tenabo disks are largely made out of the local sandstone, while those at Gran Quivira and Pueblo Pardo are largely made from the local limestones. The abundance of these disks is very conspicuous

in the Tompiro area and it is equally surprising that they do not turn up at other eastern Pueblos, for example at Pecos (Kidder 1932) and Paako (Lambert 1954).

LITERATURE REVIEW

Toulouse (1949:22) in his excavations at Abo states: "Disks: Of the chipped stone tools, simple disks predominate over all others. They were shaped largely of sandstone, with some of shale, quartzite, and limestone. Ordinarily they had two flat surfaces; occasionally there was but one smooth surface, the other being chipped all over. Disks varied in size from 3 inches in diameter to approximtely 7.5 inches, and from 0.5 inch in thickness to 2.0 inches. Their use is problematical."

Toulouse and Stephenson (1960:30), in their report on their excavations at Pueblo Pardo, state: "Stone disks (a) Roughly chipped, limestone and sandstone disks of 2.5 inches to 4.0 inches diameter and 0.5 inches to 1.0 inch thickness (18 specimens) have broad, vertical edges with no evidence of a cutting or scraping edge."

Vivian (1964:132-135) recovered thirty-six plano-convex disks in his excavations at Gran Quivira; thirty-three (92 percent) were made of limestone.

discarded disks and obtained favorable results that seemed to duplicate the wear patterns found on some collected disks.

DISCUSSION

Out of the eighteen limestone discoidal disks recorded during the archaeological survey of Gran Quivira, seven were not in close association with any artifacts, sherds or features. Eight were in association with Chupadero Black-on-white jar sherds, one with a hearth, one with a glaze bowl sherd, and one with a Jornada Brown jar sherd. Thus, nine out of eighteen (50 percent) were in close proximity with jar sherds. The average diameter of these discoidals was 73.44 mm. Young (1981:127), in his excavations of Mound 7, measured the necks of ten Chupadero Black-on-white jars and they had inside diameters of 63 to 90 mm. with an average of 77 mm (Hayes 1981:70). The 1,350 analyzed disks have a mean diameter of 77 x 72 mm (Young 1981:127); thus, the Mound 7 disks and Chupadero Black-on-white jar openings have essentially the same diameters.

The limestone disks examined during the field survey did not show any sign of battering or wear. If these disks were used as jar lids, wear would be minimal. The large number of disks present in Mound 7 (1,350 collected) which were only about one-third of the total excavated (Young 1981:127), suggests uses other then as gaming pieces. Mound 7 probably

represents 10 percent of the total mound areas. If we assume that Mound 7 contained 4,050 disks, then there could be approximately 40,500 disks at Gran Quivira alone.

Why jar lids of stone rather than ceramic lids or large broken sherds? Several hypothesis can be given: (1) If jars are kept on the roofs of the Pueblos, stone lids would not be as liable to blow off as would lighter ceramic lids and the additional weight of stone would more likely discourage rodents; (2) If stored inside or outside, rodents would be less likely to move the lids of storage vessels; (3) Limestone is abundant at Gran Quivira, and Pueblo Pardo. A disk could be knapped fairly easily, more so than producing a ceramic lid for the same purpose.

The association of disks with Chupadero Black-on-white is interesting. Hayes (1981:70) states: "A jar this size (Chupadero Black-on-white) could contain almost 15 quarts." These jars are ideal sizes for liquid or grain storage. Water was a problem at Gran Quivira during historic times and lids on storage vessels would help to keep down evaporation loss and the edges could be sealed with mud for long-term grain storage.

Due to the size of the disks, they could also be readily utilized as throwing stones (they fit the hand well), for hunting or defense, and some could have been utilized as

gaming stones as suggested by others (Vivian 1964:133-134; Young 1981:127) as they were already abundant in the Pueblo. This would explain why only a few of them show signs of battering or bruising.

SUMMARY

It is suggested that the stone disks found in the Tompiro Pueblos are mainly jar lids, contrary to popular belief that they are gaming stones. Those located during the Gran Quivira survey were found in association with jar sherds (50 percent) or else by themselves (50 percent). The diameter of the disks found during the Mound 7 excavations matches the average inside opening of the Chupadero Black-on-white jars (77 mm) measured by Hayes and closely parallels the average disk diameter (73.44 mm) of those recorded on the Gran Quivira survey by Beckett (1981).

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