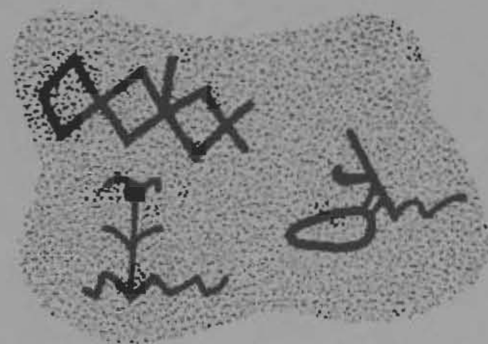
BUREAU OF LAND MANAGEMENT



California
Desert
District

The Prehistory and Management of Cultural Resources in the Red Mountain Area

1 BACKGROUND TO PREHISTORY OF THE EL PASO / RED MOUNTAIN DESERT REGION

2 AN ARCHAEOLOGICAL PROTECTION AND STABILIZATION PLAN FOR THE SQUAW SPRING WELL ARCHAEOLOGICAL DISTRICT NEAR RED MOUNTAIN, CALIFORNIA

cultural resource publications
anthropology - history

Cover illustrations by Clara Stapp, Illustrator, Bureau of Land Management, California Desert District. Petroglyph design from Squaw Spring (SBr 2613), in Northwestern San Bernardino County, California.

Forward

This volume contains two working papers on the prehistory of the California Desert. The first paper entitled "Background to Prehistory of the El Paso/Red Mountain Desert Region" by Matthew C. Hall and James P. Barker et. al. is a reprint of the 1975 edition. It is the direct result of work undertaken as the result of an environmental analysis report prepared by the Bureau of Land Management for the leasing of geothermal resources in the Red Mountain vicinity. The detailed discussion of the prehistory of the area is extremely important to general prehistory of the Upper Mojave Desert.

The second paper "An Archaeological Protection and Stabilization Plan for the Squaw Spring Well Archaeological District near Red Mountain, California" is authored by Russell L. Kaldenberg and Jan Townsend following recommendations made in the Red Mountain Geothermal Environmental Analysis Report which was greatly influenced by the Hall and Barker report cited above. This report is a logical sequence to the first and is a step by step method by which cultural resource specialists may affect the protection of cultural resources. Gary Stumpf (Salem District Office) and Butch and Ginger Hancock (A.R.T. maps) are to be thanked for their outstanding assistance in the Squaw Spring Project as are Gail Givens (former Area Manager for the Barstow Resource Area), William Olsen, Gerry Hillier, Bruce Ottenfeld, Ron Keller, Bary Freet, Tracy Cortez, and Clara Stapp who as usual, did the fantastic rock art illustrations throughout the volume. All rock art illustrations are from Steam Well and Squaw Spring.

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Riverside, California
1981

General Editor
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1

BACKGROUND TO PREHISTORY OF THE EL PASO / RED MOUNTAIN DESERT REGION

by
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with contributions by
Toni B. Snyder and Richard A. Weaver

edited by
Harry W. Lawton

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CALIFORNIA DESERT DISTRICT

SBr-3087. Rock Circle on Small Playa, William Olsen provides scale. Golden Valley region of Red Mountain Planning Unit.

General view easterly of Lava Mountains from Squaw Spring Archaeological District Red Mountain Planning Unit.

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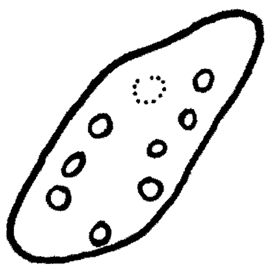

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INTRODUCTION

This report represents the second in a series of regional (i.e., Planning Unit) studies undertaken or scheduled for the California Desert Planning Program, United States Department of Interior, Bureau of Land Management. Both the initial report, "Background to Prehistory of the Yuha Desert Region" (Weide and Barker 1974), and the present one were prepared by the Archaeological Research Unit, Dry Lands Research Institute, University of California, Riverside.

The intent of these studies is to provide the BLM with an overview of information pertaining to the prehistory of a planning unit, which can then serve as background for the cultural resource section of the Unit Resource Analysis. Basic objectives in the studies are to describe and discuss available archaeological and ethnological data. The information is presented in terms of ethnohistory and ethnography, previous archaeological research, culture history (or sequence), potential archaeological significance, and archaeologically sensitive areas within the planning unit. Ultimately, the background information may be incorporated into a program of statistical sampling of archaeological inventory areas in the California Desert under development by the BLM (cf. Weide 1973; Weide and Barker 1974: 90-96). The program is being designed to yield projections of patterns of site locations and densities in the desert which, ideally, will be instrumental in long-term planning of use and development in the California Desert.

As defined by the Bureau of Land Management, the El Paso/Red Mountain Planning Units cover an area of variable terrain comprised of approximately 1.6 million acres in southeastern California (Fig. 1). The El Paso Planning Unit lies in the northeastern corner of Kern County, while the Red Mountain Planning Unit is located in the northwestern corner of San Bernardino County and contains an additional portion, North Searles Valley, in southern Inyo County. Geographic boundaries for the study area as a whole shall be set somewhat arbitrarily as: the northern Tehachapi and southernmost Sierra Nevada Mountains (i.e., Scodie Mountains) on the west; the northern margin of Rogers Dry Lake and the Kramer Hills on the south; eastern Searles Valley, Granite Mountain, Black Mountain, and Water Valley on the east; and the southern Argus Range and China Lake on the north.

The format to be followed features four main sections and two short concluding sections. To provide an idea of the environmental setting, the first section considers the general geologic, hydrologic, vegetational and climatic evolution of the El Paso/Red Mountain Planning Units. A rough synopsis of post-contact events and developments is provided in the second section which, due to the nature of the record, emphasizes ethnohistoric insights into aboriginal lifeways and the impact (i.e., physical remains) of historic mining activities. The third section summarizes ethnographic data on aboriginal utilization of lands encompassed by the planning units, bearing in mind that there have been no comprehensive studies of peoples who specifically occupied the defined territories. The fourth section presents an archaeological sequence of culture history for the study area based on what limited data are available and, primarily, on inferential evidence gleaned from

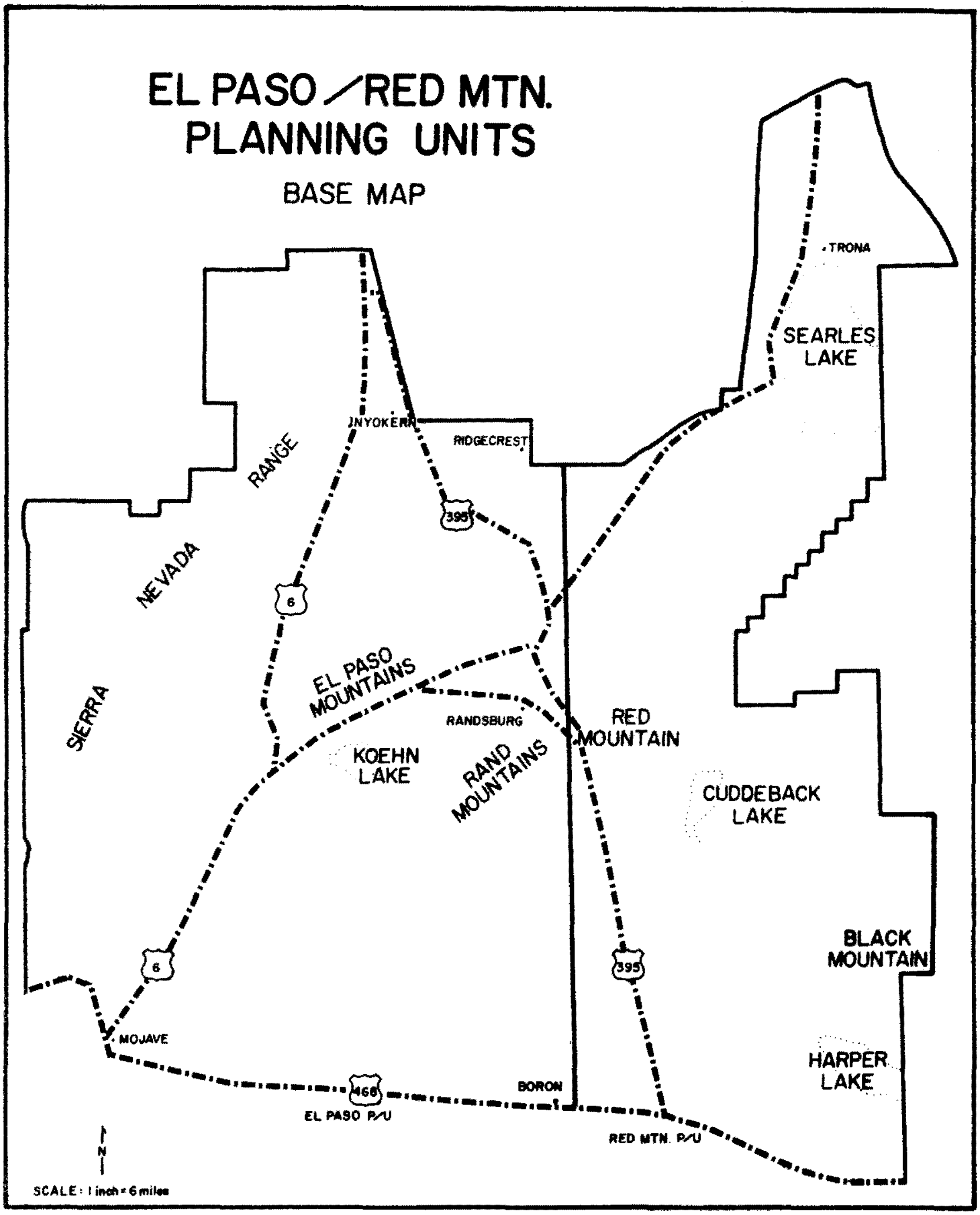
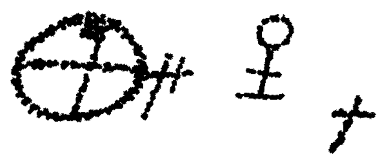

EL PASO / RED MTN.
PLANNING UNITS
BASE MAP
TRONA
SEARLES LAKE
INYOKERN
RIDGECREST
RANGE
NEVADA
SIERRA
395
6
EL PASO MOUNTAINS
RANDSBURG
RED MOUNTAIN
KOEHN LAKE
RAND MOUNTAINS
CUDDEBACK LAKE
BLACK MOUNTAIN
HARPER LAKE
MOJAVE
466
BORON
EL PASO P/U
RED MTN. P/U
N
SCALE: 1 inch = 6 miles

FIGURE 1

the archaeological record in surrounding territories and the Great Basin. Although there have been locationally selective site surveys (e.g., in the El Paso Mountains and at Black Canyon), no large-scale archaeological investigations have been conducted in either of the planning units. Nonetheless, preliminary indications are that the region has witnessed a long and varied pattern of human occupation. Each of the four main sections includes a short introduction intended to outline particular objectives and delineate certain inherent difficulties of the research.

Following presentation of an inferred culture history, brief consideration is given to the overall and potential archaeological significance of the El Paso/Red Mountain Planning Units. For example, the possibility of studying, through analysis of archaeological remains, the dynamic relationship between man and his habitat, cultural response(s) to an evolving environment, or interaction between human groups. The concluding portion of the report offers a description of the distribution of known archaeological sites, a brief discussion of discernible site location patterns in terms of regional research questions generated from the archaeological and ethnological records, and an indication of possibly sensitive archaeological areas in the El Paso/Red Mountain Planning Units.

The report is accompanied by two base maps; one locates known or recorded prehistoric sites, the other delimits known or potential areas of archaeological significance in the El Paso/Red Mountain Planning Units.



REGIONAL ENVIRONMENTAL HISTORY OF THE EL PASO/RED MOUNTAIN PLANNING UNITS

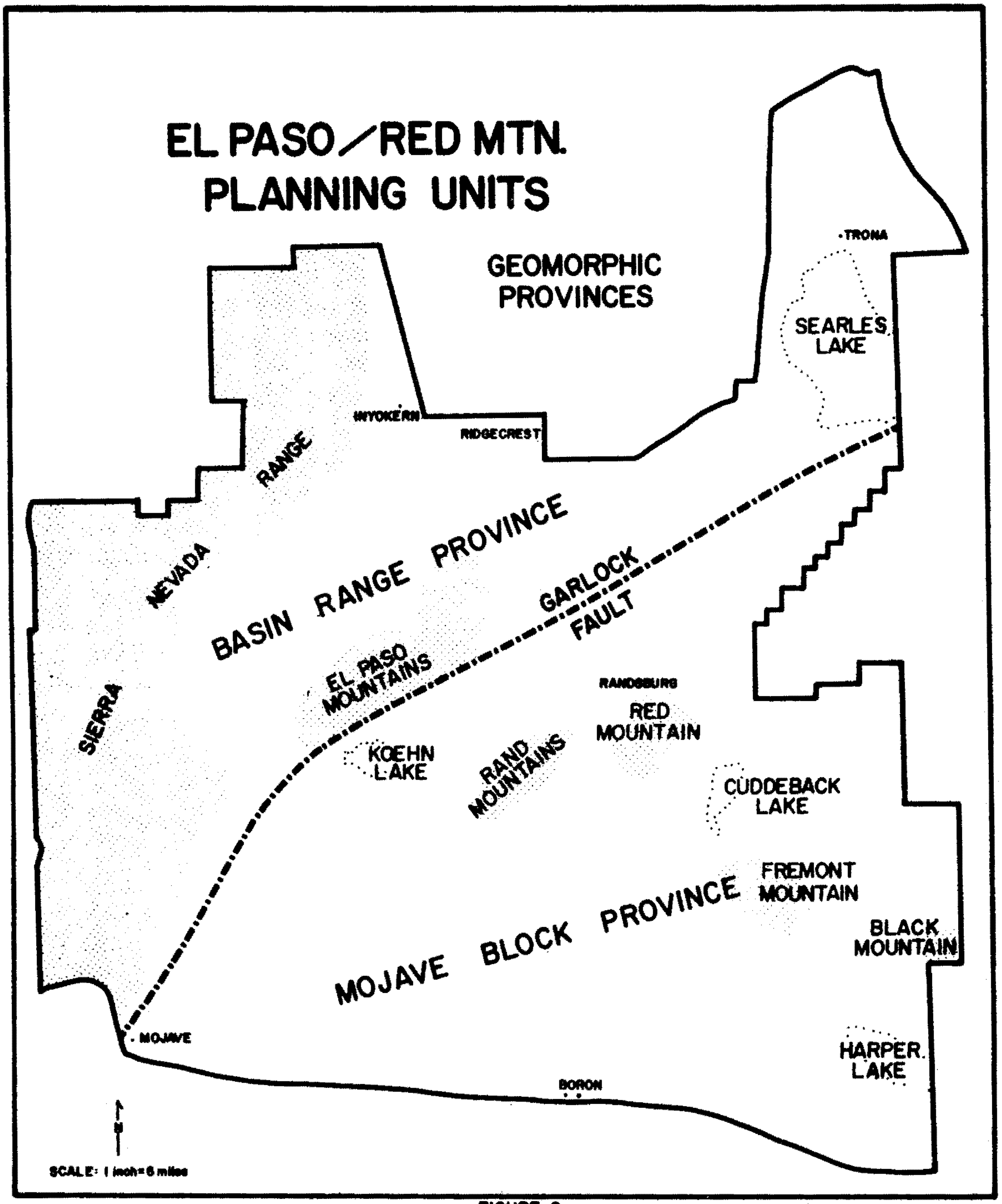
INTRODUCTION

Owing to an intimate bond between man and nature, artifactual evidence and inferred collective behavior of a cultural system reflect, to different degrees, the concern with environment in basic, day-to-day human existence. Though environment and culture cannot be considered independent variables, the study of a cultural system's ecological situation constitutes but one, albeit major, factor in the explanation of cultural processes. In this context, this section provides a description of the regional environmental history of the El Paso/Red Mountain Planning Units. Consideration is given to the general geologic history of the study area for two reasons: (1) in the long run of time, it is geologic action following cultural deposition that influences the extent and condition of archaeological remains (Malde 1964a; Heizer and Graham 1967:27; Hole and Heizer 1969:82); and, (2) as a result of geologic processes over time, certain substances (e.g., chalcedony, quartz, obsidian) were formed that undoubtedly performed a vital role as sources of raw materials for tool manufacture by human populations. Hydrologic, vegetational, and climatic elements of regional environmental history are also discussed for each affected the interaction between culture and environment.

There is some controversy among geologists as to the exact geomorphic province boundaries contained within the El Paso/Red Mountain Planning Units (Hewitt 1954:5). In part, this may be due to the fact that much of the region has not been studied in detail and its history is imperfectly known (Hind 1952:89). For the purposes of this report, the planning units lie within the Mojave Desert region as defined by Hewitt (1954).

Again, following Hewitt (1954), the Garlock Fault, which bisects the area from approximately the city of Mojave in the southwest to Searles Dry Lake in the northeast, subdivides the planning units into two geomorphic provinces. The name "Mojave Block" will be applied to that portion of the Mojave Desert region within the planning units lying south of the Garlock Fault. The area north of the fault will be referred to as the "Basin Ranges Province" (Fig. 2).

There are four major aspects of the regional geologic and environmental history that are especially relevant to the archaeological evaluation of the planning units. These include the general geologic, hydrologic, vegetational, and climatic evolutions of the area. This portion of the report presents a brief summary of these aspects of the geologic and environmental history of the El Paso/Red Mountain Planning Units. Because the study area has been largely ignored by scholars and is so extensive, data from many parts of it are incomplete or nonexistent. As a result, only a partial picture of how the present landscape was formed can be constructed. However, enough information is available so that all geological periods at least can be described. Nevertheless, a survey of the literature indicated that not all geologists interpret certain features in the same way, particularly in assigning ages for



EL PASO / RED MTN.
PLANNING UNITS
GEOMORPHIC
PROVINCES
TRONA
SEARLES
LAKE
INYOKERN
RIDGECREST
SIERRA
NEVADA
RANGE
BASIN RANGE PROVINCE
GARLOCK
FAULT
EL PASO
MOUNTAINS
RANDSBURG
RED
MOUNTAIN
KOEHN
LAKE
RAND
MOUNTAINS
CUDDEBACK
LAKE
FREMONT
MOUNTAIN
BLACK
MOUNTAIN
MOJAVE BLOCK PROVINCE
MOJAVE
BORON
HARPER
LAKE
N
SCALE: 1 inch=6 miles

FIGURE 2

various geologic events. In general, such disagreements lie in the realm of detailed analyses, which have not been carried out and are beyond the scope of this report.

GEOLOGIC EVOLUTION

The particular time span most relevant to this background study falls into the Quaternary, which is subidivided into the Pleistocene and Holocene (Recent) periods of the geologic time scale. The Quaternary encompasses approximately the last two million years of earth's history and the entire period of man's presence on earth. Although present interests lie primarily in the Quaternary, a brief summary of events in the preceding geologic periods will be given to provide a better overall understanding of the evolution of the El Paso/Red Mountain Planning Units. It is noteworthy that the existing literature indicates that the evolution of the area covered by the planning units was essentially uniform.

Pre-Cambrian Era

During the early Pre-Cambrian, a thick series of sediments were deposited throughout the Mojave Desert region, probably as a result of the area's submergence under a large sea (Hewitt 1954:6; Dibblee 1952:40, 1968:54). After deposition, these sediments underwent large-scale deformation and orogeny which uplifted the area into a series of upland plains and mountains (Hewitt 1954:6; Dibblee 1952, 1968).

The metasedimentary rocks from this period, lying in scattered exposures, are known throughout the Mojave Desert region by such general names as the Pelona Schist, the Waterman Gneissic Complex, and the Pahrumph Series. Specific exposures may have their own names, such as the Rand Schist in the Rand Mountains and the Mesquite Schist in the El Paso Mountains. By the close of the Pre-Cambrian, these upland areas had undergone a period of severe erosion, which reduced them to a low relief area (Hewitt 1954:9; Dibblee 1952:54).

Paleozoic Era

During the Paleozoic, the area was again submerged under a widespread shallow sea. This submergence resulted in the deposition of another series of sediments, commonly known as the Garlock Series. The most pertinent aspect of these sediments is the remarkably large percentage of siliceous sediments, now present as the chalcedony family of cryptocrystallines. The exact source of these enormous amounts of silica is unknown. However, it is believed that the siliceous sediments resulted from a combined deposition of microscopic siliceous organisms and extrusive tuffs, both of which were metamorphosed to form the existing chalcedonies. Another important result of this deposition was the formation of existing quartz and quartzite deposits (Dibblee 1952:40-43, 1968; Hewitt 1954).

As a result of later deformation, these deposits exist in scattered exposures throughout the planning units. It was these deposits that probably supplied an excellent source of tool material for later aboriginal populations.

Mesozoic Era

As a result of the Nevadan orogeny during the Jurassic-Cretaceous periods of the Mesozoic era, the Mojave Desert region emerged from the Paleozoic sea. During this orogeny, the pre-existing Pre-Cambrian and Paleozoic formations underwent severe deformation, becoming deeply folded into the earth's crust where further static metamorphism took place. During this period, the metasedimentary country rock was regionally invaded by platonic intrusion of the southern California/Sierran granitic batholith. This intrusion, which occurred in several waves, resulted in the dramatic uplift of the entire region. Following this uplift, the region suffered severe erosion that again reduced the area to low relief (Hewitt 1954:11-14; Dibblee 1952, 1968; Samsel 1962).

Cenozoic Era

The early Tertiary period of the Cenozoic era was characterized by widespread recurrent uplift and severe erosion throughout the Mojave Desert region. However, the distribution of early Tertiary sediment (Golar Formation) and those of later periods indicates that the history of the Mojave Block differs from that of the Basin Ranges to the north (Hewitt 1954:14).

During or following the Eocene-Oligocene deposition of the Golar Formation, there appears to have been an extended period of intense recurrent deformation that continued into the middle Pleistocene epoch. This recurrent deformation, and associated erosion, resulted in the general uplift of the areas both north and south of the present Barstow syncline, which resulted from this peripheral upflit. It is believed that, beginning in the late Mesozoic, most of the major fault systems that exist in the Mojave Block today, including the San Andreas and Garlock faults, were formed. These seem to fall into two main categories. Those in the southern portion of the block, including the Helendale, Harper, and Blackwater faults, tend to strike to the northwest and persist for some distance. Those faults located in the northern portion of the block, on the other hand, tend to have diverse orientations and are generally localized. An analysis of the features of both groups of faults suggest that they formed in response to the great compression which the Mojave Block was undergoing during the Tertiary and Quaternary periods. Most of the major contemporary physiographic features of the Mojave Block are associated with fault zones, thus the Mojave Block began taking its present physiographic form at this time (Hind 1952:89; Hewitt 1954:17-18).

During this era, there appears to have been two major periods of volcanic activity. The first of these occurred as local extrusions in the Rand, Red, Lava, and El Paso mountains. Other local representations of this period of volcanism are found in the Fremont and Opal mountain areas to the south. The second major period of volcanism, the Black Mountain Basalt Flows, could have occurred as late as the middle Pleistocene. These flows occurred throughout the southeastern quarter of the planning units, but are most readily observable in the vicinity of the Black and Opal mountains (Hewitt 1954:16-18; Dibblee 1952, 1968; Samsel 1962).

As a result of these (and other) periods of volcanism, the planning unit area contains numerous exposures of volcanic extrusives, including obsidian. This material, in addition to the previously mentioned chalcedony deposits, supplied excellent sources of tool material for aboriginal populations.

The record of Tertiary and Quaternary sediments in the Mojave Block indicates that until the middle or late Pleistocene erosion almost kept pace with the contemporaneous orogenies (Hewitt 1954:16-18). By this time, the province had generally assumed its present structural form.

Pleistocene/Holocene Mojave Block Hydrology

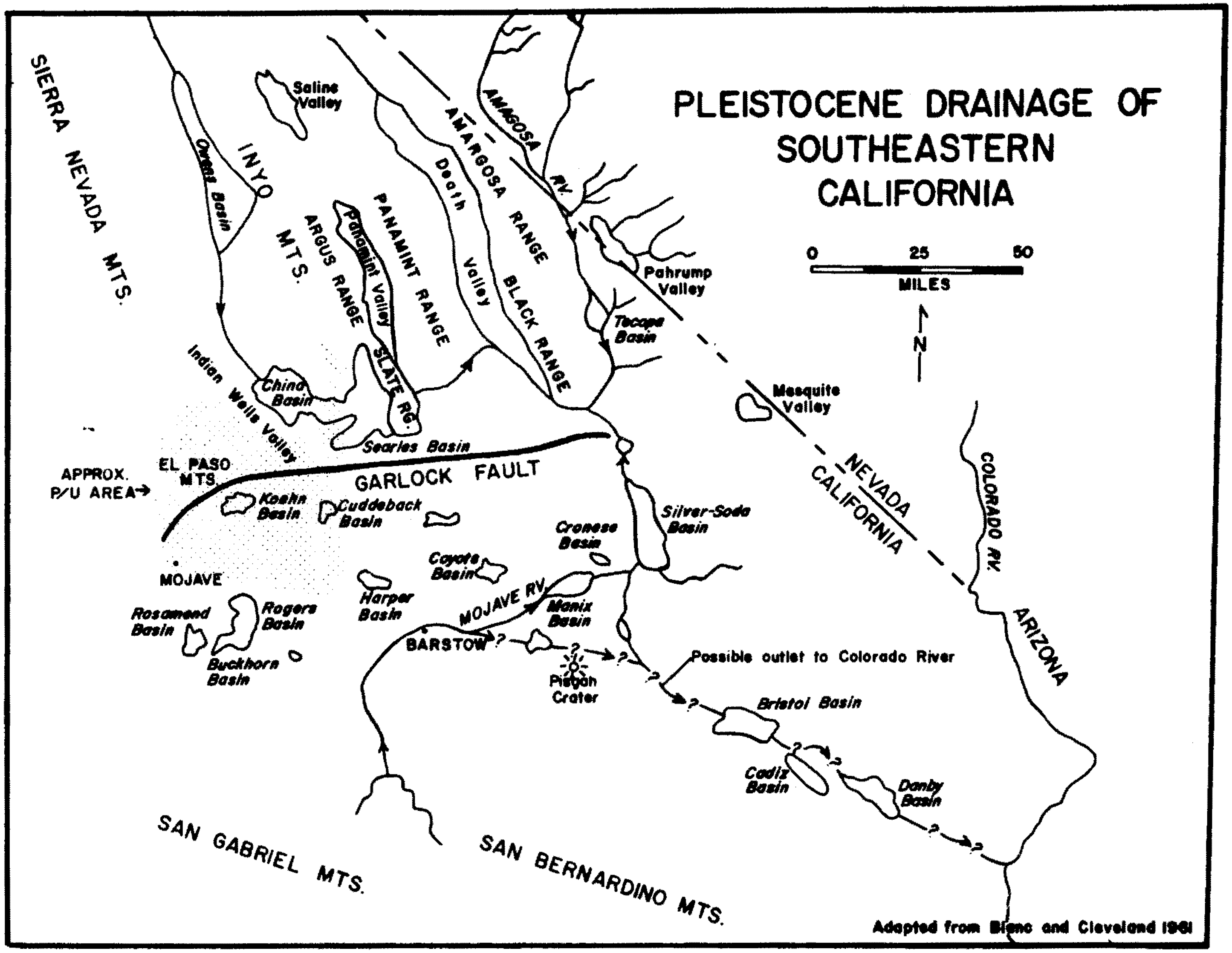
Although evidence is far from complete on the hydrologic history of the Mojave Block, existing evidence indicates, for the most part, that this region was drained by a single, well integrated drainage system (Blackwelder 1954:37) (Fig. 3).

Late Tertiary orogeny within the Mojave Block resulted in the uplift of the western portions of the block, including the formation of the San Gabriel and San Bernardino mountain ranges. Water flowing off the slopes of these ranges, as well as the Sierra, Tehachapi, El Paso, and lesser ranges collected in a number of shallow basins throughout the Mojave Block. It is also probable that the Mojave River took form during the Late Tertiary orogeny. In the course of its flow, the Mojave River integrated a number of these basin lakes. Others, however, including Koehn, Rosamond, and Rogers lakes, as well as smaller unnamed lakes, never overflowed to join the Mojave River (Blackwelder 1954:37).

There is some evidence indicating that during the early Pleistocene the basin lakes in the Cuddeback and Superior valleys drained into Harper Valley. From there the water flowed into the Mojave River via the Hinkley Valley. However, as deformation of the Mojave Block continued into the middle and late Pleistocene, drainage to the Mojave River was permanently disrupted (Dibblee 1968:53-54). The continued deformation, volcanism, and orogeny that occurred throughout the Pleistocene also appears to have resulted in a major change in the Mojave Drainage System (Hewitt 1954:19; Blackwelder 1954:37-39).

Until the late Pleistocene, the Mojave River was apparently an external drainage system which flowed southeast to join the Colorado River via Ludlow, Bristol, Cadiz, and Danby lakes. However, as the probable combined result of continued uplift and lava flows from the building of Pisgah Volcano, the Mojave River appears to have been diverted east and northward to join Lake Manly.

The periods of greatest pluvial activity seem to roughly correspond to the McGee (2.6 million years B.P.), Sherwin (700,000 years B.P.), and especially the Tahoe (70-60,000 years B.P.), Tioga (46,000 years B.P.), and Laurentide (23-10,000 years B.P.) glacial periods. These periods of greatest flow were interspaced by progressively drier interglacial periods (Wahrhafrig and Birman 1965:306; Meinzer 1922:541-552; Flint and Gale 1958:710). The



PLEISTOCENE DRAINAGE OF SOUTHEASTERN CALIFORNIA
0 25 50
MILES
N
SIERRA NEVADA MTS.
INYO MTS.
Owens Basin
Saline Valley
ARGUS RANGE
Panamint Valley
PANAMINT RANGE
SLATE RG.
Death Valley
AMARGOSA RANGE
AMARGOSA RV.
BLACK RANGE
Pahrump Valley
Tecopa Basin
Mesquite Valley
NEVADA
CALIFORNIA
ARIZONA
COLORADO RV.
Indian Wells Valley
China Basin
Searles Basin
EL PASO MTS.
APPROX. P/U AREA
GARLOCK FAULT
Koehn Basin
Cuddeback Basin
MOJAVE
Rosamond Basin
Rogers Basin
Buckhorn Basin
Harper Basin
Coyote Basin
Cronese Basin
Silver-Soda Basin
MOJAVE RV.
Manix Basin
BARSTOW
Pisgah Crater
Possible outlet to Colorado River
Bristol Basin
Cadiz Basin
Danby Basin
SAN GABRIEL MTS.
SAN BERNARDINO MTS.
Adapted from Blanc and Cleveland 1961

FIGURE 3

result of this progressively drier climate was the formation of existing playa sediments in the former basin lakes, and the associated desiccation of the Mojave River. Thus, by the early Holocene, the Mojave Block had assumed both its present structural and hydrologic form.

Basin Range Province Physiographic Evolution and Hydrology

Evidence indicates that while the fault systems of the Mojave Block were forming in response to tectonic compression during the early Tertiary (and subsequent periods) a similar fault formation period was occurring in the Basin Ranges Province to the north (Gale 1915:253; Hind 1952:89; Hewitt 1954:17-18).

This fault activity resulted in the formation of the distinctive northward trending mountain ranges of this region, including the Coso, Argus, Slate, Panamint, Black, and Amargosa mountain ranges and the intervening Owens, Indian Wells, Salt Wells, Searles, Panamint, and Death valleys (Gale 1915:253). The subsequent geologic history of these basins may be sumarized as one of extensive alluvial deposition resulting from the outwash of the surrounding mountains (Gale 1915:253; Hewitt 1954:7).

On the basis of strandlines, subsurface stratigraphy, and sedimentary deposition, it has been determined that these intervening valleys formed a continuous drainage system for this region, herein termed the Owens Drainage System. Unlike the Mojave Block system, however, the Owens system never had an external outlet. This fact accounts for the much more extensive saline and borate deposits now present in the former Owens system as compared to those of the Mojave system (Flint and Gale 1958:689-693). From accumulated water in the Owens Valley Basin, there was a series of successive overflows into the Indian Wells and Salt Wells valleys to form China Lake. From here the overflow formed Searles Lake in the Searles Basin and Lake Manly in Death Valley, with Lake Manly forming the final lake in this internal drainage system (Blanc and Cleveland 1961a:2-5) (Fig. 3).

As in the Mojave Block, the periods of greatest pluvial activity roughly correlate with the periods of glaciation. Again, these periods were interspaced by progressively drier interglacial periods. The result of this progressively drier climate was the formation of the various saline playa sediments which are so prominent in the area today (Flint and Gale 1958:689-693; Roosma 1958).

VEGETATION AND CLIMATE

Since climatic factors directly influence the composition and distribution of regional vegetational zones, perhaps the single most accurate procedure for reconstructing the paleovegetation and climate is the study of fossil pollen, i.e., palynology. To date, however, no suitable regional pollen chronology has been developed for the Mojave Desert region or for the area encompassed by the El Paso/Red Mountain Planning Units.

As a result of the lack of extensive knowledge about the paleovegetation, no detailed map can be constructed for this area. Furthermore, most of the information that does exist on the paleovegetation of the Mojave Desert region is drawn from locations outside the planning units. However, the nature and distribution of this evidence indicates that the vegetation and climate was largely similar throughout most of the deserts of the western United States (Axelrod 1950:239-248). From an examination and correlation of existing sources (Axelrod 1950; Roosma 1958; Wells and Jorgensen 1964; Wells and Berger 1967; Munz and Keck 1968; Ornduff 1974), a rough overview of the general climatic and vegetational evolution of the area can be developed.

As stated by Axelrod (1950), the Pleistocene vegetation of western North America has evolved as a result of a progressive trend toward a drier climate, a trend which apparently has been intensified since the Tertiary. An examination of existing literature seems to indicate that during the more temperate periods of the Pleistocene, which roughly coincide with the periods of glaciation, the general area encompassed by the planning units received. on the order of five to eight inches, more annual precipitation than at present. Further, these pluvial periods were accompanied by an approximate 5°F drop in yearly mean temperature. Thus, overall, it can be concluded that the Pleistocene climate of the planning units was far more temperate than that which characterizes the same region today.

To avoid confusion later in this section, the significant plant species that comprise the plant communities discussed will not be included in the body of the text. These communities are listed in Appendix I in the order mentioned in the text.

Although some local variations exist, evidence indicates that during the wetter pluvial periods of the Pleistocene, the area under consideration was covered to a minimum altitude of approximately 600 meters by what appears to have been a plant community similar to what Munz and Keck (1968) term Desert Woodland. Below this elevation, the region was apparently characterized by a Valley Grassland plant community (Roosma 1958; Wells and Jorgensen 1964; Wells and Berger 1967; Munz and Keck 1968:1-21; Ornduff 1974:61-126).

The Desert Woodland vegetational zone can be roughly subdivided into three interrelated plant communities: (1) Northern Juniper Type Woodland; (2) Piñon-Juniper Woodland; and, (3) the Joshua Tree Woodland. Although an exact delineation (demarcation) of the geographical area covered by each of these subdivisions within the zone is difficult, the Desert Woodland zone apparently centered around a core area consisting of Piñon-Juniper Woodland, which descended to a minimum altitude of approximately 1,000 meters. On the basis of existing information, it appears that the upper elevations of this region, above 1,500 meters, were dominated by a Northern Juniper Type Woodland while the plant species typical of the present Joshua Tree Woodland prevailed down to approximately 600 meters on the lower, well-drained slopes of the region.

Below the 600-meter level, the Desert Woodland gradually gave way to a predominance of perennial bunch grasses which characterize the Valley Grassland plant community. On the basis of known faunal remains, it is apparent that these vegetational zones supported an extensive population of grazing animals (Munz and Keck 1968:1-21; Axelrod 1950:268-270; Roosma 1958; Wells and Jorgensen 1964; Wells and Berger 1967; Ornduff 1974:61-121).

With the onset of the progressively drier interglacial periods, these plant communities migrated to higher elevations, became localized in climax zones, or disappeared from the area in response to the changing climatic conditions. A further response to these changing climatic conditions was the increased distribution and dominance of the desert plant communities known today (Munz and Keck 1968:1-21; Axelrod 1950:260-298; Ornduff 1974:61-126).

In summary, it appears that the Pleistocene Mojave Desert region proved a far more hospitable habitat, especially in terms of available plant and animal resources, than is typical of the region at present. By the opening of the Holocene, however, this relatively rich environment had evolved into the modern arid desert, both in structure and environment.

PRESENT CLIMATE AND VEGETATION

The Mojave Desert region, including the area of the El Paso/Red Mountain Planning Units, constitutes an arid desert environment typical of much of the southwestern United States. The region receives less than five inches of mean annual precipitation in the lower valley areas, and a slightly higher average in the upland mountain areas. Nearly all of this mositure comes in the form of winter rainstorms brought up from either the Gulf Coast or over the crest of the Sierra Nevada Mountains from the Pacific Ocean. The area also receives a small amount of moisture in the form of thunderstorms and flash floods, which usually occur between April and October. Spring is climatically characterized by the frequent occurrence of strong westerly gales which sweep the region. The normal temperatures of this area range from a high in excess of 100°F in the summer to below freezing in the winter months (Dibblee 1952:9, 1968:9; Hind 1952:89; Ornduff 1974:34-60).

The vegetational distribution of this area is characterized by four major and four minor plant communities (Appendix I).

Desert scrubs, which characterize the major portion of the study area, fall into four plant communities as defined by Munz and Keck (1968). These include: (1) the Sagebrush; (2) Shadscale; (3) Creosote; and, (4) Alkali plant communities. The Alkali community has the least distribution of these major zonations since it is specifically adapted to the alkaline soils that exist on former lake playas. However, there are playa beds that are too alkaline even for this community. Such areas form notable sterile zones within the study area.

In addition to the four major plant communities, there are relic communities of the formerly extensive Pleistocene Valley Grassland, Piñon-Juniper Woodland, and Joshua Tree Woodland scattered throughout the area covered by the planning units (Dibblee 1952:9, 1968:9; Hind 1952:89; Munz and Keck 1968; Ornduff 1974).

AN ETHNOHISTORY AND HISTORY OF THE EL PASO/RED MOUNTAIN PLANNING UNITS

INTRODUCTION

Beginning in 1772, with the travels of Pedro Fages, and continuing to the present the El Paso/Red Mountain Planning Units have been the scene of many complex interactions between a harsh desert environment and native peoples, European explorers, and American settlers (Fig. 4). Since Fages, there has been increasing historical activity, climaxing in the mining boom of the period between 1890 and 1925. The earliest contact period saw sporadic exploration. This was followed, in the 1800s, by waves of immigrants trying to reach the promised land on the California coast. The climax came in the early 1890s when gold fever touched off a period of intensive mining activity. However, the gold played out, as did the tungsten and silver booms which followed, and after the 1920s the history of the units is one of reduction and economic stagnation (Fig. 5).

This section focuses on the way in which historical activity has impacted the El Paso/Red Mountain environment and highlights the physical remains of that activity. It also outlines the scant ethnohistorical references to aboriginal lifeways. Early expeditions and government-sponsored incursions are discussed only as they relate to either the development of the area or to aboriginal lifeways. Due to the content and nature of the historical record, emphasis is placed on mineral production within the planning units, and it is necessary to call on events which took place outside of the planning units.

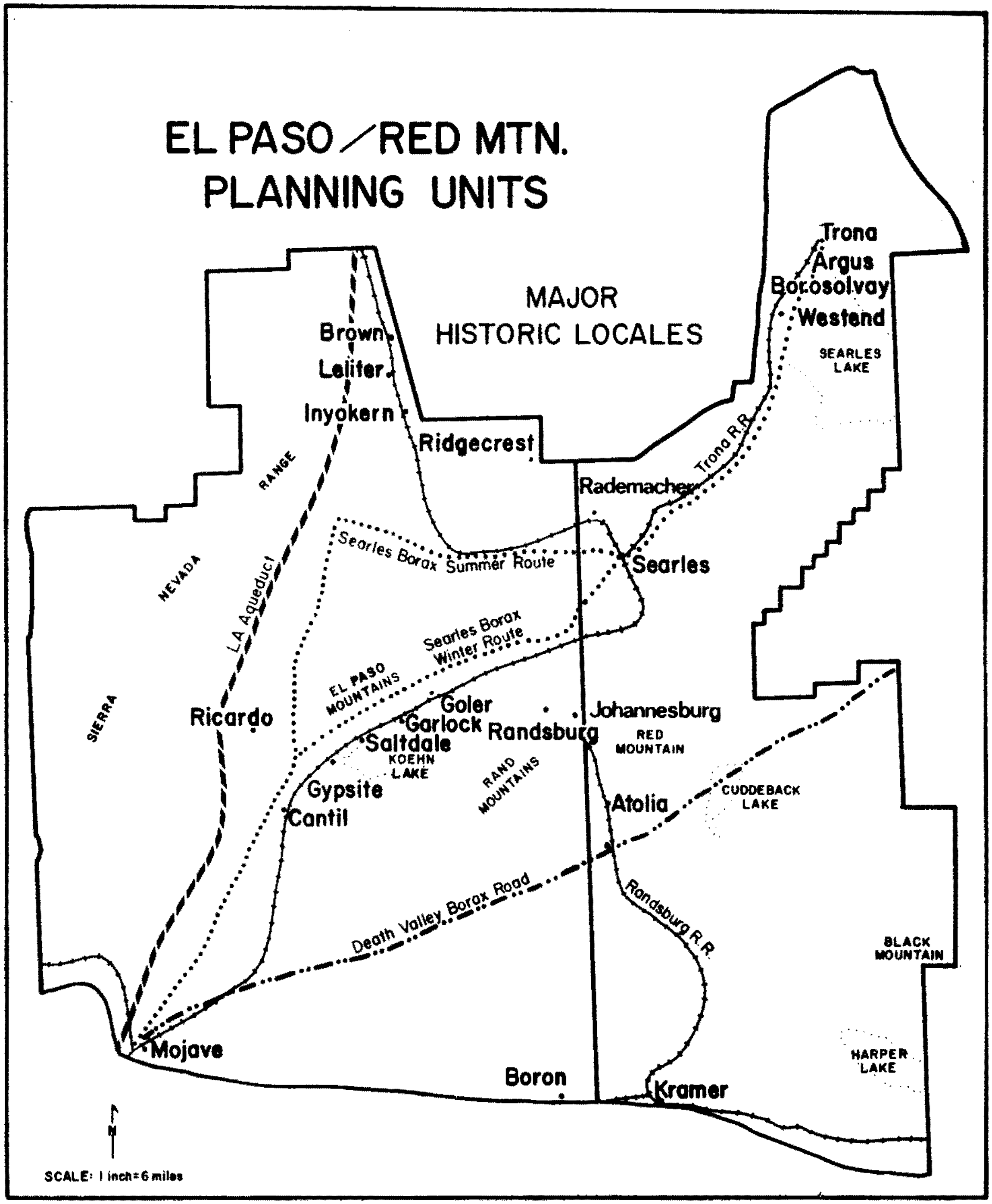
The section is divided into two major parts. The first is a general overview of the history of the planning units. It serves to put Part Two into context. Part Two is an inventory of the historic remains located within the planning units. It is structured in terms of the 24 quadrangles which have been numbered by the Bureau of Land Management. Where possible, the present condition of these remains are noted.

HISTORY AND ETHNOHISTORY: AN OVERVIEW

The history and ethnohistory of the El Paso/Red Mountain Planning Units is divided into three general periods. The first is called the exploratory period and covers the events between the first Spanish contact in the area and the beginning of immigrant wagon crossings. The second period is called the immigrant period and it traces events between the crossing of the first American wagon train and the discovery of gold in the area. The third period is called the mining period and covers the events between the discovery of gold and the end of large scale mining activities.

Exploratory Period (1772-1844)

In 1772, Pedro Fages made the first recorded journey through Cajon Pass, along the edge of the Mojave Desert, across Antelope Valley, and into the Southern San Joaquin


EL PASO / RED MTN.
PLANNING UNITS
MAJOR
HISTORIC LOCALES
Trona
Argus
Borosolvay
Westend
SEARLES
LAKE
Trona R.R.
Brown
Leliter
Inyokern
Ridgecrest
Rademacher
Searles
Searles Borax Summer Route
Searles Borax Winter Route
RANGE
NEVADA
SIERRA
LA Aqueduct
EL PASO
MOUNTAINS
Ricardo
Goler
Garlock
Saltdale
Randsburg
Johannesburg
RED
MOUNTAIN
KOEHN
LAKE
RAND
MOUNTAINS
Gypsite
Cantil
Atolia
CUDDEBACK
LAKE
Death Valley Borax Road
Randsburg R.R.
BLACK
MOUNTAIN
HARPER
LAKE
Mojave
Boron
Kramer
N
SCALE: 1 inch=6 miles
FIGURE 4

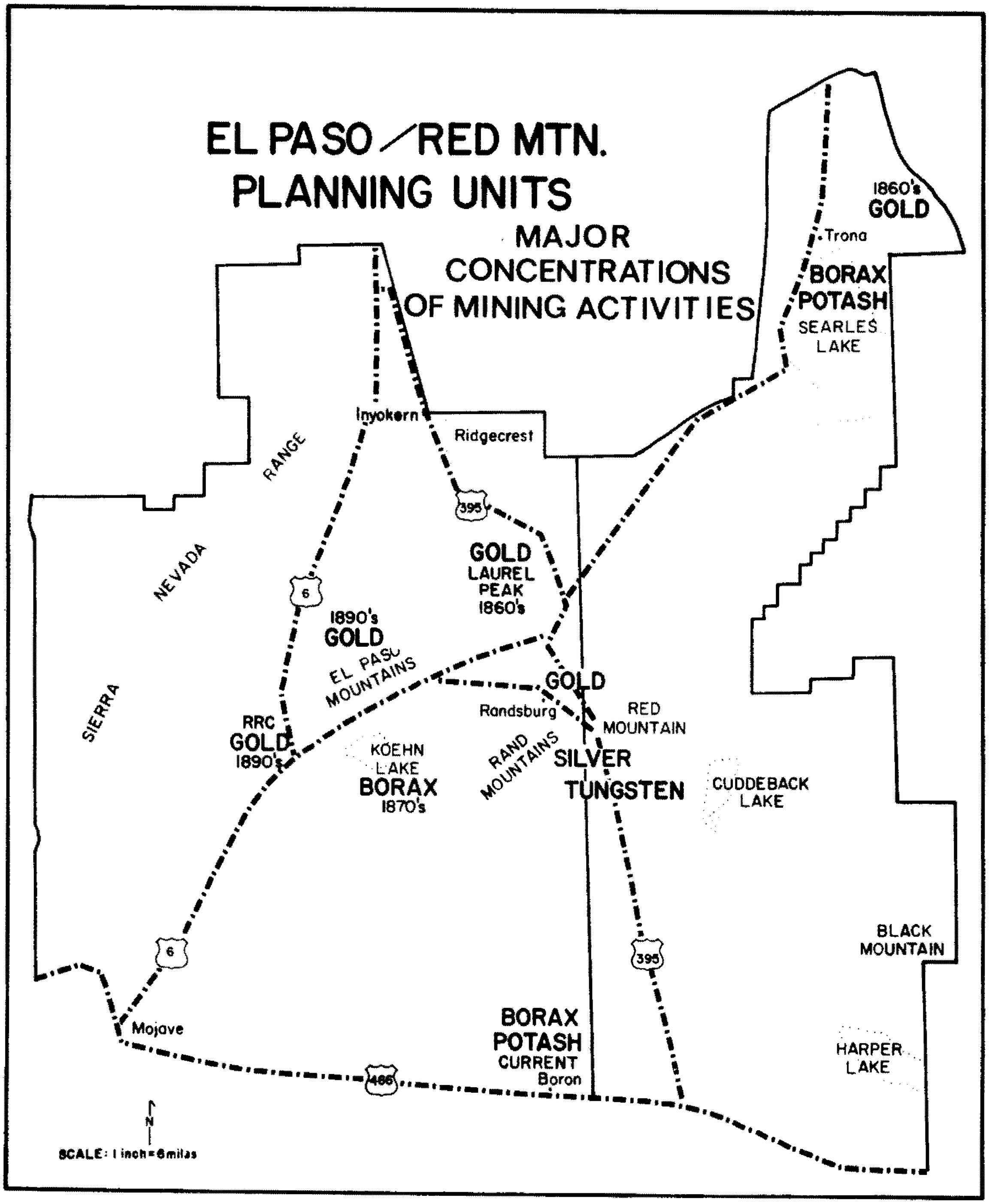

EL PASO / RED MTN.
PLANNING UNITS
MAJOR
CONCENTRATIONS
OF MINING ACTIVITIES
1860's
GOLD
Trona
BORAX
POTASH
SEARLES
LAKE
Inyokern
Ridgecrest
RANGE
NEVADA
SIERRA
395
GOLD
LAUREL
PEAK
1860's
6
1890's
GOLD
EL PASO
MOUNTAINS
GOLD
Randsburg
RED
MOUNTAIN
RRC
GOLD
1890's
KOEHN
LAKE
BORAX
1870's
RAND
MOUNTAINS
SILVER
TUNGSTEN
CUDDEBACK
LAKE
BLACK
MOUNTAIN
6
395
Mojave
BORAX
POTASH
CURRENT
Boron
HARPER
LAKE
466
N
SCALE: 1 inch = 6 miles

FIGURE 5

Valley (Bolton 1931:218). While skirting the Mojave Desert, he may have passed through the planning units. The area he crossed was claimed at least in part by such Indian groups as the Kawaiisu, Koso, and Chemehuevi. Fages, and other Spanish explorers (the most notable being Francisco Garcés) did not greatly disrupt aboriginal lifeways or leave any physical remains. The only evidence of their passage is contained in the journals they kept during their travels.

Fages made his historic journey while chasing Spaniards who had deserted the missions to live with the Indians. While on this punitive expedition, Fages apparently left San Diego in 1772, and crossed the peninsular ranges into the Imerpial Valley. He then turned north to travel up the valley and across Cajon Pass to the edge of the Mojave Desert. From Cajon Pass he turned northwest and traveled along the edge of the Mojave, across Antelope Valley and into the Southern San Joaquin Valley (Bolton 1931). As quoted by Bolton (1931:215), this is how Fages described his trip across the planning units:

> We went along the plain toward the north keeping to the Sierra on account of water, traveling about twenty-five leagues until we reached the pass of Buena Vista. Most of these twenty-five leagues we were passing through groves of date palms, the land both east and south having more and more palm groves. But the country appeared to be very short of water. We saw many smokes along the plain.

This description of Fages' crossing is so compressed that it obviously mixes features of the Imperial Valley with those of the Mojave Desert. For example, the plain he is referring to has been interpreted (Bolton 1931:214) as being the Mojave Desert. However, the date groves are stands of native California Fan Palm (*Washingtonia filifera* Lindl.). These only occurred in the Imperial Valley. The "many smokes" have been interpreted as representing Indian camps. Thus, the earliest account of a possible crossing of the planning units tells us that there were Indians on the Mojave Desert, as well as date groves in the Imperial Valley and a lack of water in both places. Today, most of the Indians and date palms are gone and there is still a lack of water. Fages goes on to give relatively extensive descriptions of aboriginal lifeways in the San Joaquin Valley, saying nothing more about aboriginal groups within the planning units.

The next recorded contact between Spanish explorers and the planning units is recorded in the diaries of Francisco Garcés, who in March, April, and May of 1776 partially retraced some of Fages' route (Coues 1900). Garcés left Mexico City in 1775 with the historic Anza party to settle San Francisco. But in the vicinity of present-day Needles, California, Garcés left the expedition to strike out across the Mojave Desert. On March 8, 1776, Garcés discovered the Mojave River. He first encountered the River in the vicinity of Soda Lake and followed it upstream to the San Bernardino Mountains. Garcés (Coues 1900:235) stopped at an Indian camp on March 11th. He described the Indians (which he called Beneme and Coues identifies as Panamint) as being so poor that they were entirely naked with only rush roots for food. This agrees with later ethnographic accounts. Given that it was March, the Indians should have been eating starvation foods such as rush roots. Garcés goes on to note that these Indians had baskets and that mesquite trees and wild grapes were located in the vicinity of the camp.

For some reason, Garcés left the Mojave River on March 18, 1776 and struck out to the west. Coues (1900:237) interprets Garcés' diary to indicate that Garcés went toward Grapevine, California. If this is true, then Garcés could have entered the planning units. Near Grapevine, and by inference in the planning units, Garcés stopped at an Indian camp inhabited by some 40 Beneme (Panamint) Indians, and two days later, on March 20th, he stopped at another Indian camp of some 70 individuals. Unfortunately, Garcés does not give any further information than to note the size of the camps. After leaving these camps, Garcés turned southeast and, on March 22nd, crossed Cajon Pass to arrive at Mission San Gabriel on March 24, 1776.

Garcés left San Gabriel on April 9, 1776 intent on exploring the San Joaquin Valley (Coues 1900:254). After leaving San Gabriel, Garcés proceeded to the San Fernando Valley, crossed the mountains in the Newhall/Castaic area, and went through Tejon Pass to the San Joaquin Valley. On May 10th, he left the Valley by crossing the Sierra at either Tehachapi Pass or through Kelso Valley and on May 14th stopped at the present-day town of Mojave (Coues 1900:264). Kelso Valley is in the El Paso Planning Unit and Mojave is in the southwest corner of the unit. Garcés notes that there was an Indian camp between the San Joaquin Valley and Mojave. He reached this camp on May 12, 1776 and noted that there were only women and children present; the men he presumed were out hunting (Coues 1900:263). The Indians gave Garcés meat, seeds, and shell beads. This is the extent of his description of these Indians. On May 15, 1776, Garcés left Mojave and crossed the Mojave Desert to the Mojave River and on to the Colorado River. By the time he had reached the Mojave River, Garcés had passed out of the planning units for the last time.

There are no further Spanish references to explorations in the planning units. The first recorded American incursion into the planning units was that of Jedediah Smith in 1826-27 (Dale 1941:179; Sullivan 1934:ii). Smith was a fur trapper who left St. Louis with William Ashley in the spring of 1826, intent on traveling overland to the Pacific coast. There has been some controversy over the dates when Smith crossed the planning units (Merriam 1924:25-30). However, Smith actually crossed the Mojave Desert twice. In 1826, he left the Great Salt Lake in Utah and traveled across the Mojave Desert to San Bernardino and San Gabriel. However, he also left San Gabriel in 1827 and again traveled along the edge of the Mojave Desert and into the San Joaquin Valley. On the 1826 trip he did not actually enter the planning units. The closest he came was the Mojave River. On the 1827 trip Jedediah Smith probably did cross the planning units.

According to Smith's narrative (Sullivan 1934; Dale 1941), he reached the Mojave River (which he called Inconstant) in 1826. Smith came across two Indian lodges on the Mojave River. He traded some cloth, knives, and beads for two horses, some cane grass candy, and water. This indicates that by 1826 the Indians on the Mojave Desert were using horses. Near the head of the Mojave River, in Vanyume territory, he again stopped at some Indian lodges and purchased two horses. This leg of Smith's trip ended on November 27, 1826 when he reached Mission San Gabriel (Sullivan 1934:34-35; Dale 1941:187). Smith's narrative does not give any details of his crossing of the planning units. It merely notes that he left San Gabriel early in 1827 and, after traveling 300 miles, reached the upper San Joaquin Valley.

In April of 1884, John C. Fremont led a U.S. Government-sponsored expedition up the San Joaquin Valley, and on April 15, 1844 he crossed the mountains at the southern end of the valley, thus entering the planning units from the west (Fremont 1845:255-256). In his journal, Fremont (1845:256) recorded his first impression of the Mojave Desert, as seen from the Tehachapis. He said:

> A hot mist lay over it [the Mojave] to-day, through which it had a white and glistening appearance; here and there a few dry looking buttes and isolated black ridges rose suddenly upon it. "There, said our guide, there are the great *llanos*, there is neither water nor grass–nothing; every animal that goes out upon them, dies."

This comment by Fremont's guide indicates that he was not from a group which claimed the area. Fremont traveled south and east along the edge of the desert. He noted the presence of Yucca plants and recorded seeing several antelope (Fremont 1845:257). On April 18, 1844, Fremont crossed out of the planning units and came to the Mojave River. While traveling down the Mojave River, Fremont (1845:260) met a group of six Indians which he described as follows:

> Here a party of six Indians came into camp, poor and hungry, and quite in keeping with the character of the country. Their arms were bows of unusual length, each had a large gourd, strengthened with meshes of cord, in which he carried water. They proved to be Mohahve [sic] . . . He [their leader] said they lived upon a large river in the southeast (Colorado River) . . . They sometimes came over to trade with the Indians of the Sierra, bringing with them blankets and goods.

This is an obvious reference to a group of Colorado River Indians who were traveling across the Mojave Desert to trade with groups from the Sierra Nevada Mountains. This supports the trade information contained in the ethnographic sketch section. Also, Fremont (1845:260) says that on his map he called the river the Mohahve. This seems to be the first time that this name is applied to the river presently called the Mojave River. This is the last bit of information offered by Fremont that is relevant to the planning units.

There were other American explorers through the area, the most notable being Joseph Reddeford Walker who pioneered and named Walker Pass in 1834. However, Fremont and Smith were the major explorers and limited though their reports may be, they offer the best ethnohistoric data for this period.

Immigrant Period (1844-1860)

In 1843, Joseph Walker returned to the area to lead the Joseph B. Chiles immigrant party to the California coast. The Chiles party was the first substantial American immigrant wagon train to cross Walker Pass (Fremont 1845:165).

Probably the most famous immigrant party to cross the planning units was the Bennett-Arcane party. In 1849, this party, also known as the Death Valley 49er's, traveled from Cobble Creek, Utah, through Death Valley, and on to Los Angeles (Manly 1894).

Death Valley was named as a result of their trials and hardships while making this crossing. While trying to find a way out of Death Valley, it was decided that the party would camp while the two youngest, strongest men attempted to find a route (Manly 1894:151). The men selected were William Lewis Manly and John Rogers. Unfortunately, Manly's account of his crossing does not give accurate locational information, but it does seem clear from Rogers' brief account (Belden 1954:62-68) that they did leave the southern end of Death Valley and cross the Mojave Desert to the Newhall area. This would mean that they crossed the planning units sometime late in 1849. Manly and Rogers reached the San Fernando Valley near the end of 1849, and they returned to Death Valley, again crossing the planning units, to guide the rest of the party to the San Fernando Valley (Manly 1894:176-215). Sometime in February, 1850, probably about the middle of the month, the whole party left Death Valley and crossed the planning units (Manly 1894:216-222). Manly does not report on the Indians or on the environment of the area except to note that it lacked water and was covered by Yucca trees.

As a result of the military appropriation act passed by Congress on March 3, 1853, the U.S. Army was allocated $150,000 to survey all possible routes for a Pacific railroad (Anderson 1948:177-195). In May of 1853, Secretary of War Jefferson Davis ordered Lt. Robert Stockton Williamson to attempt to find a suitable pass through the Southern Sierra Nevada Mountains (Anderson 1948:181). On July 10, 1853, Williamson left San Francisco with a party of 49 men. He was intent on surveying the southern San Joaquin Valley and hoped to find a suitable pass through the mountains to the Mojave Desert (Anderson 1948:182). In the course of his survey, Williamson evaluated all three major southern passes, namely Walker, Tejon, and the little known Tehachapi.

During his survey, Williamson made several observations about the Indians he encountered. At a spring approximately 13 miles south of Walker Pass (in the El Paso Planning Unit) he recorded the following encounter with some Indians:

> There was an abundance of bulrush growing here, and a large number of Indians, probably 50 or 60, engaged in gathering it. They had evidently heard of us from their neighbors, and did not show the least sign of fear; but men, women, and children came flocking around us, evincing much curiosity [Williamson 1885:18].

This is the extent of the information Williamson provides about aboriginal activities within the planning units. However, he does discuss several encounters with Indians in the areas immediately surrounding the planning units. While in Walker Pass, Williamson observed that:

> There were a number of Indians, both on the creek and at the spring near our camp . . . They seemed at this season (summer 1853) to be principally employed in collecting a kind of bulrush or cane . . . They cut the cane and spread it in the sun to dry, and afterwards by threshing, separated the sugar from the leaf. The cane itself had no sweet taste [Williamson 1885:15].

As a final reference to the Indians in the area, Williamson noted that he came across two Indian camps in the vicinity of Tehachapi Pass. Unfortunately, he does not elaborate.

The lack of references to aboriginal lifeways during both the exploratory periods and the early immigrant periods stresses the low population density that must have been characteristic of precontact times (see ethnographic section). There were many parties crossing the area at all times of the year, so it is unlikely that they would have so little contact with the Indians, unless there were relatively few Indians in the area. From the first contact in 1772 until after the Williamson survey in 1853 the lifeways of the Indians were not significantly impacted by contact with either the Spanish or the Americans. However, the addition of horses, guns, knives, etc. undoubtedly had an effect on Indian lifestyles.

This lack of impact was not to last. In the 1850s gold was discovered in the Kern River area. It has been estimated that during the years from 1854-55 more than 5,000 Americans immigrated to the Kern River area (Wynn 1963:14). Following the usual destructive policy, when there was a large influx of Americans into an area, the Indians living in that area were removed to reservations so that they would not hinder American development. So, coincident with the discovery of gold, the first California Indian reservation was established at Fort Tejon, located at the foot of the Tehachapi Mountains (Caughey 1952:xxxi-xxxiii). In 1852, Edward F. Beale came to California as the superintendent of Indian Affairs. In the fall of 1853, he negotiated with the Indians in the Tejon Pass area and convinced them to occupy a reservation to be maintained at Fort Tejon. By February of 1854, there were more than 2,500 Indians, who had been rounded up from the surrounding area (probably including the planning units), living in a mission-like community on the reservation. They planted 2,000 acres in wheat, 500 in barley, and 150 in corn and maintained this acreage through a ditch irrigation system (Caughey 1952:xxxii). The establishment of the Fort Tejon reservation marks the beginning of relatively intense mining activity in the planning units. This activity began in the 1860s, reached a climax during the period 1890-1925, and has declined (but not ended) since 1925.

Mining Period (1860-1925)

Gold was discovered on the side of Laurel Mountain in the El Paso Mountains in 1863 (Wynn 1963:16). The area was designated the El Paso Mining District, and El Paso City, its major settlement, was founded. On April 1, 1863, the *Los Angeles Tri Weekly News* reported:

> There is much activity in the El Paso Mining District, situated beyond Tahachape (sic) and about 50 miles to this side of the Slate Range. We have seen specimens of several newly discovered lodes; one of gold quartz, which is without doubt the richest yet discovered in this part of the state.

This report touched off the minor gold rush that was to mark the beginning of intensive mining activities. Slightly prior to this the Slate Range Mining District was organized to exploit the gold discoveries there. Its two most famous citizens were the Searles brothers, who in the 1870s would develop the borate deposits at Searles Lake (Chalfant 1922:135). A mill was set up in the district, and it processed 3,000 tons of ore assayed at $35 a ton. The excitement over this strike, as well as the one in the El Paso Mountains brought speculators to the area in droves. Over 300 claims were filed, and stock corporations were formed (Chalfant 1922:136). It was these floating stock companies as well as attempts to oversell the districts that led to the cessation of mining activities in these areas by the 1870s.

In the 1870s, mining activity shifted to the borate deposits that were discovered as early as 1862. In 1873-74, there was intense competition to control marsh lands and playas (Hanks 1883:26). It was the Searles brothers (John and Dennis) who emerged from this competition to dominate borate exploitation. During the period from 1873 to 1881, these brothers and their borax works on Searles Lake would be the primary source of borax for all of California (Chickering 1938:116). The water to run the borax works was carried through iron pipes from the Argus Mountains, some 7.5 miles away. Mesquite wood and sagebrush were used as fuel for the boilers until the late 1880s when wood was replaced by crude oil (DeGroot 1890:539). At maximum production, the Searles plant attained a capacity of 100 tons of processed borax a month. The refined borax was transported, in 20-mule-team trains, to the siding at Mojave (DeGroot 1890:534). In the 1880s, the borax deposits in Death Valley were developed and borate mining emphasis shifted to this area. By 1887, the price of borates had dropped so low that the works closed.

In the 1890s, gold was again discovered in the planning units. There was placer mining in Red Rock Canyon in 1893. The Goler Mining District was organized on March 15, 1893, and a stage route was opened to Goler in the fall of 1893 (Fairbanks 1894:458). At Goler, the miners lived in dugouts, and water for digging was hauled in from Mesquite Springs (Wynn 1963:59). In spite of this, it was the lack of water that led to Goler being abandoned in favor of the mining activities in the Rand Mountains (Wynn 1963:64).

On April 25, 1895, three claims were staked for gold deposits on the side of Rand Mountain (Wynn 1963:80). This marked the beginning of the Rand Mountain Mining District and the Yellow Aster Mine. It was also the beginning of the most intensive mining activities in the planning units. The original settlement of Randsburg took place as an adjunct to the activities at the Yellow Aster. The miners lived as close to the mine as possible and were housed in dugouts and tents (Wynn 1963:93-94). Later, abandoned camps such as Goler would be scavenged for their buildings. By 1896, overpopulation and encroachment on Yellow Aster property led to the resettlement of Randsburg on its present site, downhill from the mine (Wynn 1963:95). By the end of 1896, the population of Randsburg and surrounding camps was over 1,500 housed in over 300 structures. The ore from Randsburg was processed at mills located in Garlock, and the town of Johannesburg developed as a freight center. Randsburg was destroyed twice by fire, once in January of 1898, and again on May 6, 1898.

By the turn of the century, gold deposits were playing out and it seemed as if the mining boom would soon be over. The attempts to mine gold in the Randsburg area had always been plagued by a heavy white mineral that interfered with the concentration of gold ore. In 1903, this mineral was identified as scheelite, from which tungsten is derived (Hulin 1925:108). This discovery set off a rush to stake the area for scheelite. In 1906, the Atolia

Mining Company began operations on the main scheelite deposits in the Randsburg area. Production was limited until the beginning of World War I which created a demand for tungsten. In 1913, scheelite was selling for $7 a ton and by 1916 it was worth $80 a ton (Hulin 1925:108). After the war, the price dropped so low that scheelite mining was halted. The Atolia Mining Company ceased operations on March 1, 1919, and once again the Randsburg area was faced with abandonment.

It was saved for the last time on April 12, 1919 when several silver deposits were discovered, and the California Rand Silver Mine was opened (Hulin 1925:108-109). Silver prospecting reached its peak during 1922-23. During this time, over 50 shafts were sunk within a radius of one mile from the original find (Hulin 1925:109). The expiration of the Pittman Act (which guaranteed a domestic price of $1 an ounce for silver) in 1923 did not seem to immediately affect the California Rand Silver Mining Company, but it did stop exploration. Over the long run, it was probably the lack of a good price that slowly forced the end of large scale mining activities. By 1925 the mill was running only one shift a day and most people had left the area. There is still mining activity today, although it is on a very small scale.

The major non-mine related activity of the Mining Period was the construction of the aqueduct from Owens Valley to Los Angeles. The drought which occurred during the summer of 1904 convinced the residents of Los Angeles that they needed more water (Los Angeles Department of Public Service 1916:9). After a feasibility study, the Owens River was chosen as the best source for this water. During 1904 and 1905, routes were surveyed and land rights were quietly secured (Los Angeles Department of Public Service 1916:10, 47). A bond issue was passed in 1906, and by 1908 work crews had been hired and assigned to camps built along the project route. Lines of communication, including roads, trails, telephone, and telegraph were constructed and water sources located and improved (Los Angeles Department of Public Service 1961:14, 18).

The actual construction of the aqueduct began in 1908 and was completed by 1913 at a cost of $23,000,000 (Los Angeles Department of Public Service 1916:9). Within the planning units, the plan of the aqueduct, as defined by William Mullholand, was as follows:

> Little Lake to Indian Wells . . . 24 miles of conduit, tunnels, and siphon pipes . . . Indian Wells to Red Rock Summit . . . 20 miles of conduit flumes and siphon . . . Red Rock Canyon through Jawbone Canyon to the Mojave Desert . . . 19 miles of conduit, siphons, and tunnels . . . Mojave Desert to the west end of Antelope Valley . . . 68 miles of concrete conduit [Los Angeles Department of Public Service 1916:18].

The impact of the building of the aqueduct was not limited to the actual route of the project. For example, the cement used was obtained from Cuddeback Ranch and a Tufa mill was constructed there.

HISTORIC REMAINS: AN INVENTORY

Part I of this section (History and Ethnohistory: An Overview) is an outline of the major historic events which occurred in the planning units between 1772 and 1925. It serves as background material to put the following inventory into perspective. This inventory is structured in terms of the 15 minute USGS quadrangles that make up the planning units. The Bureau of Land Management has numbered these quads from north to east beginning in the northwest corner of the planning units. This order is followed in the inventory.

Quadrangle Number 1: Little Lake

The major historic remains in the Little Lake quadrangle are associated with the settlement known as Brown (Section 12, T25, R38E, SBB&M). Brown was settled in 1909 as a work camp for the Los Angeles Aqueduct. Brown contained a saloon, hotel, several businesses, and the Mount Owen School, a one-room school which was open until 1951 (Pierson 1964:18). Aqueduct workers were housed in temporary barracks and were fed in the Diamond mess tent, which was the largest structure in the town. The animals for the aqueduct were stabled in a large corral located just outside of town.

In 1909, the Owenyo branch of the Southern Pacific Railroad railroad reached Brown and a large corrugated iron shed was built to house railroad operations (Pierson 1964:19). In 1909-10, Brown also served as a supply center for the miners and prospectors who came to the area as a result of the 1909 gold strike in Wilson Canyon.

Pierson (1964:18) reported that in 1964 all that remained of Brown, which once had a population of over 2,000, was a few random buildings and not more than three or four people.

Quadrangle Number 2: Trona

The Slate Range Mining District was formed on November 10, 1861 for the purpose of exploiting gold deposits (Chalfant 1922:135). The Albany and Morrow mines produced more than 3,000 tons of gold ore valued at $35 a ton. The ore was first crushed in an arrastra and processed in a mill. In the rush to claim Slate Range gold, over 300 claims were staked and in the rush to claim the resources of greenhorns from the east many floating stock companies were created. Speculators were said to have floated the Francis mine with more than one million dollars worth of stock (Chalfant 1922:136). Floating stock companies, hard sell over speculation, and a lack of new strikes contributed to the end of the Slate Range gold rush. By the 1870s, most of the ore produced in the district was from the Haggin Mine. This ore was either milled at the Riely mill in the Argus Mountains or it was shipped to San Francisco (DeGroot 1890:533).

The major problems in working the Slate Range deposits were centered around transportation. Due to distance, shipping rates to and from the railroads were prohibitive.

To cut down on these costs, the San Bernardino/Panamint stage road was built in 1873. It ran parallel to Highway 178.

In August of 1873, from 45 to 100 Chinese workers were imported to construct the road across the Slate Range (Starry 1969:12). Chinese workers were used to fill all the washes on the route and to level steep inclines. They did this using only picks, shovels, and wheelbarrows (Starry 1969:12). These workers were housed in one large camp where they lived in one-room structures made from mesquite stumps and boards from wrecked wagons. Anti-Chinese feelings led to an attack on the Chinese camp, and as a result of this the Chinese left the area in the fall of 1873. The ruins of the Chinese camp were visited in 1969, and it was reported that only scattered rock ruins remained of the camp (Starry 1969:13).

The road which the Chinese started was finished by October 1873, and it was rapidly over-used for freight traffic. It was a hazardous route and soon became littered with the wrecks of wagons that had skidded out of control (Starry 1969:12-13). Way stations were built at one-day intervals (ca. 10 miles) by the Meyerson Stage and Freight Line which maintained the road between 1873 and 1896. In the 1890s this road served as the main freight line between the railroad station at Johannesburg and Ballarat and Death Valley (Starry 1969:11).

Borax was discovered on the playa of Searles Lake in 1862, however these were not worked until 1873 when a processing plant was built by the Searles brothers in the vicinity of present day Trona (Hanks 1883:26; DeGroot 1890:534; Bailey 1902:37; Thompson 1929:176). In the period between 1862 and 1873, there was intense competition over control of the deposits. In 1873, the Searles brothers emerged as the victors with the only borate operation on the lake (Chickering 1938:III; Oberteuffer 1942:12). From 1873 to 1881, the Searles brothers were the major California producers of borax (Chickering 1938:116). In 1874, the Searles borax works consisted of:

> . . . a little cabin of boards, in which they (the Searles brothers) lodged in very tight quarters, while a half a dozen Chinese, whom they employed sheltered themselves under a sort of construction of earth (adobe) [Leuba in Chickering 1938:11].

Throughout the 1870s and 1880s, the Searles borax works were expanded and modified until, in 1890:

> . . . these works were very complete in all their appointments, the several departments consisting of a concentrator, a refining, and boiler house. For doing the moving and hoisting, derricks, tramways, and similar appliances are provided, every labor saving device known, having been introduced here. Shops and outbuildings of all needed kinds; a cooperage and wharehouse, dwellings, barn, sheds, stables, corrals, etc., are all on the premises [DeGroot 1890:538].

This physical plant was operated by some 50 workers who used about 50 draft animals (DeGroot 1890:539).

Water for the works was obtained from springs in the Argus Mountains. It was piped, under a 1,000-foot pressure head, through 7.5 miles of iron pipes (DeGroot 1890:539). Prior to the late 1880s, mesquite wood and sagebrush were used as fuel for the boilers. It was reported that the desert from the works to eight miles up the valley was stripped bare to provide this fuel (Spears 1892:112). Wood fuel was replaced in 1887 by crude petroleum which was hauled to the works from Mojave. At maximum production, the Searles plant operated at a capacity of 100 tons of processed borax a month, although it was not continuously operated at this level (DeGroot 1890:537). Both Searles brothers were dead by 1898, and their borax works were closed with the death of John Searles.

The Searles brothers worked the lake bed for borax, although they knew of the presence of other marketable borates and rare earths (DeGroot 1890:176). In 1913, the Searles holdings were taken over by the American Potash and Chemical Corporation. This group developed these other deposits, founded the present town of Trona, and built the rail spur to it. Their plant is still in operation.

Quadrangle Number 3: Onyx

About 90% of the Onyx quadrangle falls outside of the planning units. Except for numerous small mines and a short segment of the Los Angeles Aqueduct, there are no significant historic resources in the portion of this quadrangle which is in the planning units.

Quadrangle Number 4: Inyokern

In 1919, the town of Inyokern (then called Siding 16) was settled. It was built to house and supply aqueduct workers and served as a freight siding on the Southern Pacific Railroad (Pierson 1964:46). In 1910, most of the aqueduct workers were moved to new sections and the people who remained in Inyokern turned to agriculture, cattle shipping, and freight handling. In 1943, Harvey Airfield was the site of a temporary camp which the Navy set up while the Naval Ordinance Testing Site was being constructed. The facility at China Lake insured that the town of Inyokern would survive as a rail station (Pierson 1964:48-49).

The major mining activity in the Inyokern quad took place in Indian Wells Canyon, the site of both gold and scheelite deposits. The largest producer of scheelite was the Hi-Peak Mine, located north of the mouth of Jawbone Canyon. A tungsten mill, built in the 1940s, was located on the northwest side of Indian Wells Canyon, about four miles west of the point at which U.S. Highway 6 crosses the canyon mouth (Troxel and Morton 1962:37). Another tungsten mill was constructed near the Fernandez Mine. It was reported that in 1957 the mill at Indian Wells Canyon was nearly intact, while by 1962 there was no trace of the Fernandez Mine mill (Troxel and Morton 1962:37).

Coyote Holes Station, an overnight stop for the Remi Nadeu freighting company, was located at the junction of the Walker Pass and Owens River roads. In the 1870s it was a major stop for both stages and freight wagons. It was reported in 1874 that Coyote Holes

Station consisted of a large wooden building and several stables (Chickering 1938:108). The famous bandit, Tiburcio Vasquez robbed this station on February 25, 1874 (Edwards 1964:17).

E. I. Edwards visited the site of Coyote Holes Station in the spring of 1964. He reported that the remains of the ¼-mile-long water pipe were still present along with the concrete smokehouse foundation and a storage cave (Edwards 1964:17). In August of 1964, he returned to the station and noted that the smokehouse foundation had been removed (Edwards 1964:42). This indicates the extent of the vandalism that is taking place within the planning units.

Two rhyolite rocks located one mile south of Coyote Holes Station have been dubbed "Robber's Roost" because they were reputed to be the hideout of Tiburcio Vasquez (Edwards 1964:21).

Quadrangle Number 5: Ridgecrest

The town of Ridgecrest began in the early 1900s as a collection of small homesteads and ranches. A dairy was established on the site of present day Ridgecrest, and the settlement became known as Crumville, after its owner (Pierson 1964:51). In 1941, with the establishment of a post office, the town was officially named Ridgecrest (Pierson 1964:52).

In 1943, the arrival of the U.S. Navy lent a sense of permanence to the town. It still serves the base as its closest town.

The Rademacher Gold Mining District was the site of most of the mining activity within the Ridgecrest quad. The district encompassed Laurel Mountain, El Paso Peaks, and some territory north of them (Starry 1974:70). The Southern Pacific Railroad built a siding at Rademacher sometime in the early 1900s.

Quadrangle Number 6: Searles Lake

The majority of the Searles Lake quadrangle is filled with Searles Lake playa. It is the site of the borax deposits that were processed at the Searles Mill located in the Trona quad.

In 1896, the Spangler Mining District was formed to exploit a gold strike northeast of Randsburg and in the south part of the quad (Starry 1974:36). Ore from this district was hauled to Garlock for milling. After several years mining activity ceased. Today there are over 4,000 feet of tunnels and drifts that remain as markers of the mines in the district (Starry 1974:36).

The most unusual feature that once existed in the Searles Lake quadrangle is the monorail railroad that was constructed and operated in 1917 and 1918 (Thompson 1929:591). It ran across the southern end of the lake, between the Trona rail line and the epsomite deposits on the other side of the Slate Range. The monorail train consisted of a single engine which pulled pairs of cars balanced on the sides of the track (Chalfant 1951:118). It attained a top speed of 15 miles per hour and could haul up to 60 tons.

The trestles for the monorail were used for fire wood by campers, and in the late 1930s scrap dealers salvaged the steel track. Today nothing remains of the monorail (McInnes 1969:35). The destruction of this unique rail line was so complete that in the 1940s, the I-bolts and nuts that once littered the line were gathered as souvenirs by trophy hunters (Keagle 1944:12).

Quadrangle Number 7: Cross Mountain

Mining was the major historic activity in the Cross Mountain quadrangle. Prior to 1900, placer gold deposits were worked in the Jawbone and Water Canyon areas. In later years, most of the gold production was at two mines, namely the Skyline Mine on Antimony Flats and the San Antonio Mine (Troxel and Morton 1962:37).

Clay was mined from the White Swan deposit, but this ceased in 1962 (Troxel and Morton 1962:37-38). Scheelite was mined at the Hi-Low Mine, and Blue Point Mine produced roofing granules (Troxel and Morton 1962:38). In 1958, three of the mines in the area (the Silver Lady, Beryl #4, and Miller Ranch) were prospected and staked for uranium; however, they have never produced (Troxel and Morton 1962:38).

In 1909, Cinco was founded as a siding on the Owenyo Branch of the Southern Pacific Railroad. It served as headquarters for the Jawbone Division of the Los Angeles Aqueduct Project. Cinco was abandoned when the aqueduct was completed.

Quadrangle Number 8: Cuddeback Lake

The major historic activity within the Cuddeback Lake quadrangle consisted of services for the trains along the Borax Road which ran from the Harmony Borax Works in Death Valley, across the quadrangle, to the rail station at Mojave (Mendenhall 1909:52-53). Thus, water sources and the stops associated with them are the major historic remains.

The most important water stop was located at Blackwater Well on the crest of a ridge about 18 miles east of Johannesburg (Mendenhall 1909:52). Mendenhall visited the well in 1909 and noted:

> . . . the well can be located by the bare ground in its neighborhood, from which campers have stripped all vegetation. The well which was dug years ago by government troops, is about 15 feet deep and is in the form of a shaft, 5 by 7 feet. The water in it is usually from 2 to 3 feet deep [Mendenhall 1909:52].

According to Mendenhall (1909:52), the water is free of alkali when the well is kept clean and frequently used, but it turns dark and foul when it is not regularly used. This well was not directly on the Borax Road, and water had to be piped ½-mile to reach it. The remnants of the pipe and its associated trenches are aids that can be used to locate the well (Mendenhall 1909:52).

Willard Well, another stopping place, was located on the Borax Road, next to Cuddeback Lake. This well is reported to have given a good supply of brackish water. When Mendenhall (1909:52) visited the well in 1909, he observed that it was partially caved in.

Quadrangle Number 9: Pilot Knob

About 95% of the Pilot Knob quadrangle is located outside of the planning units. The major point of historic interest within the planning units is Granite Wells, a stopping point on the Borax Road. It was one of the best known camping and watering places on the road (Mendenhall 1909:52). Granite Wells, located to the west of Pilot Knob, was characterized by a frame house and several stone structures in addition to the well itself (Mendenhall 1909:53). As a result of his visit to the well in 1909, Mendenhall reported:

> The best water is found in a short tunnel run through into the granite 50 feet northeast of the cabin. At the end of this tunnel is a sump hole, about 3 feet deep, in which the water collects. This water coming from the granite is cool and pure, but the sump often needs cleaning out. About 2 barrels can be got here in 24 hours [Mendenhall 1909:53].

Quadrangle Number 10: Mojave

Settlement at the present day site of Mojave began in 1876 when the Southern Pacific Railroad extended its line over Tehachapi Pass to connect Los Angeles with the San Joaquin Valley (Wynn 1963:43; Pierson 1964:5). The railroad has maintained the settlement and has provided the stability for its economy. In addition to being a rail depot, Mojave has functioned as a major center for prospectors and miners entering the Mojave Desert (Wynn 1963:45).

In the 1870s and 1880s, borax from Searles Lake as well as freight from Owens Valley was hauled to Mojave prior to being shipped by rail to Los Angeles and San Francisco. Mojave was the southern terminus for the Death Valley Borax Road. As such it was a major terminal for borax shipped in the 1880s from Death Valley (Pierson 1964:5).

In 1894, a gold strike at Soledad Mountain created a gold rush in the Mojave area (Wynn 1963:51). Some of the more important gold mines were the Queen Ester, Gray Eagle, Karma, Gypsy, and Echo (Pierson 1964:7). At this time Mojave also served as a stage stop for the hopefuls traveling to the gold strike near Randsburg (Greene 1897:558).

During the first decade of the twentieth century, Mojave was the primary supply terminal for the construction of the Los Angeles Aqueduct (Shrader 1912:538). After this Mojave remained, as it does today, the first major rail terminal on the line between Los Angeles and the San Joaquin Valley.

Quadrangle Number 11: Castle Butte

The background research for this report failed to discover remains of significant historic interest in the Castle Butte quadrangle. It was, however, crossed from northeast to southwest by both the Randsburg/Mojave Road and the Death Valley Borax Road.

Quadrangle Number 12: Boron

In 1913, colemanite, a form of borate, was discovered by J. R. Suckow in the Boron quadrangle. The Suckow Mine became part of the Pacific Borax Company, and it was operated until 1951 (Troxel and Morton 1952:39). There were a series of discoveries which followed this initial find. These included sodium borate in 1925 and rasorite and kernite in 1927 (Troxel and Morton 1962:39). By 1933, all of these holdings were consolidated by the Pacific Borax Company to form the Boron Mine, the largest producing mine in California. The Boron Mine is currently in operation. Prior to 1957, the Boron mine was worked as an underground operation, but after 1957 it was transformed into an open pit operation. The town of Boron houses and serves the employees of the Pacific Borax Company.

Quadrangle Number 13: Fremont Peak

The Gateway Mine, located about one mile west of Fremont Peak, was the site of most of the mining activity in the Fremont Mining District. Its workings consisted of 3,250 feet of drifts and cross-cut tunnels, with a shaft that attained a depth of 185 feet and was accompanied by three adits which varied from 60 to 200 feet in length (Dibblee 1968:58). The Gateway Mine has been idle since 1953.

There was gold prospecting to the northwest of Fremont Peak, and sometime prior to 1934 the Hamburger Mill site was in operation (Hulin 1934:424). The Hamburger Mill site was a gold operation that folded before there was any substantial production. Today all that remains of the mill is a concrete foundation (Dibblee 1968:58).

Quadrangle Number 14: Opal Mountain

The most well-known example of Opal Mountain mining activity is called "Scout's Cove." This mining locus has been described as follows:

> The most enduring ghost of that era of lost dreams is the sturdily constructed semi-dugout of the Opal Mining Company cut in the tufa about one mile up from the Opal Mountain Road junction. In the '40's it sometimes was referred to as the mystery hut, and this spring I was surprised to find 'Scout's Cove' painted on the door arch. There is no mystery about the dugout, and scouts didn't build it. Once on the same door arch was printed 'American Opal Company, 1910' [Weight 1958:20].

Randsburg and Barstow were connected by a road that ran across Harper Dry Lake

(Mendenhall 1909:57). Black's Well is located on this road, and it was also an important water stop on what was once known as the Panamint-San Bernardino Road (Mendenhall 1909:58). Black's Well has been described as follows:

> An adobe house which served as the headquarters of an old ranch is still standing near the well and is in good condition. The well is covered with a platform and the water stands within a few feet of the top [Mendenhall 1909:58].

Mendenhall (1909:58) also observed that the water sources in the Opal Mountain area included Murphy's Well, located on the route between Barstow and Copper City, and that all of the water holes were interconnected by a series of roads and trails.

Quadrangle Number 15: Kramer

About 95% of the Kramer quadrangle is outside of the planning units. The only point of historic interest that is within the units is Kramer Junction, the southern terminus of the Randsburg rail branch. This branch ran the 29 miles between Kramer Junction and Johannesburg (Hulin 1925:13). The Randsburg Railway Company began operation on January 17, 1898 and continued until May of 1903 when it was absorbed by the Atchison, Topeka, and Santa Fe Railorad (Wynn 1963:256). The Atchison, Topeka, and Santa Fe maintained service on the line until December 30, 1933, at which time the line was closed and the rails taken up (Wynn 1963:257).

Quadrangle Number 16: Hawes

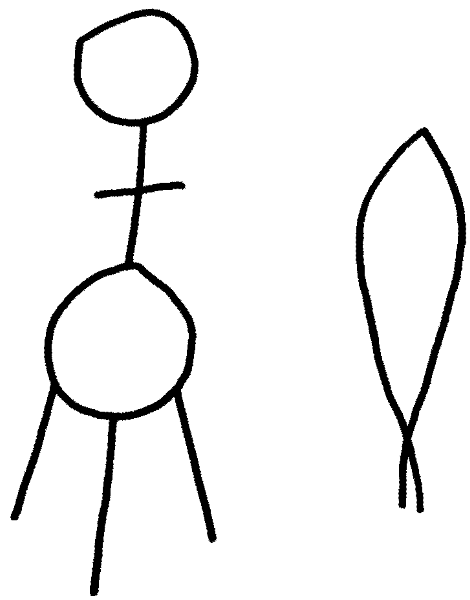
Approximately 60% of the Hawes quadrangle is outside of the planning units. The only points of interest within the units are the three sidings–Eads, Hawes, and Jingrey–maintained by the Atchison, Topeka, and Santa Fe Railroad. These sidings serve the rail line between Barstow and Mojave.

Quadrangles Numbered 17, 18, 19, 20: Saltdale and Quadrangles Numbered 21, 22, 23, 24: Randsburg

The Saltdale USGS 15-minute quadrangle and the Randsburg USGS 15-minute quadrangle have been divided into eight USGS 7.5-minute quadrangles. The four 7.5-minute quadrangles that make up the Saltdale 15-minute quadrangle have been numbered 17, 18, 19, and 20 by the Bureau of Land Management. The four 7.5-minute quadrangles that make up the Randsburg 15-minute quadrangle have been numbered 21, 22, 23, and 24 by the Bureau of Land Management. For this inventory, each of these groups of four numbered quadrangles will be considered as a single 15-minute quadrangle.

The Saltdale and Randsburg quadrangles were the scene of the most intensive and well-known activity of any quadrangles in the planning units. Due to the magnitude of the activity and the extent of the remains in these two quadrangles and because the majority of the land in them is privately owned, they will not be treated in detail.

The history of these two quadrangles is fully treated in two recent works. The first is *Gold Gamble*, published in 1974 by Roberta Martin Starry, and the second is *Desert Bonanza*, published in 1963 by Marcia Rittenhouse Wynn. The mining activities in the Randsburg quadrangle were documented in *Geology and Ore Deposits of the Randsburg Quadrangle, California* published by C. D. Hulin in 1925, as California State Mining Bureau Bulletin No. 95. The early mining activity in the Randsburg quadrangle was documented in *Gold Mining in the Randsburg Quadrangle, California*, published by Hess in 1910 as USGS Bulletin No. 30. The mining activity in the Saltdale quadrangle was documented in *Geology of the Saltdale Quadrangle, California* by Dibblee and Gay in 1952, published as California Division of Mines Bulletin No. 160 and in *Mines and Mineral Resources of Kern County, California*, published by B. W. Troxel and P. K. Morton in 1962 as California Division of Mines and Geology County Report No. 1.



ETHNOGRAPHIC SKETCH OF THE EL PASO/RED MOUNTAIN PLANNING UNITS

INTRODUCTION

Kroeber (1925:Pl. 1) assigned seven aboriginal groups to locations within the boundaries of the El Paso/Red Mountain Planning Units. Only two of these groups–the Kawaiisu and Koso (Panamint)–appear to have used the region as a major resource base. The others–Chemehuevi, Serrano, Vanyume, Kitanemuk, and Tübatulabal–seem to have had territorial claims to portions of the area, although not using it as a major part of their subsistence base.

The focus of Serrano and Vanyume activity was the San Bernardino Mountains and portions of the Mojave River (Kroeber 1925:Pl. 1, 611; Strong 1929:5-11). The Kitanemuk and Tübatulabal were concentrated in the drainages of the Kern and San Joaquin rivers (Kroeber 1925:612). The Chemehuevi were centered in the eastern Mojave Desert and seem to have been concentrated mostly between Twentynine Palms and the Colorado River (Kroeber 1925:593-594; Laird n.d.). For this reason, primary emphasis in the discussion that follows will be placed on the Koso, Kawaiisu, and Tübatulabal, although some attention will be given to the other groups (Fig. 6).

The general ethnographic record for the El Paso/Red Mountain Planning Units is extremely sparse. The record for two of these groups, Kitanemuk and Vanyume, consists of some conflict over the use of these designations, mention of linguistic affiliation, a population estimate, and a vague assignment of territories. For the other groups, the ethnographic record focuses on their activities in areas outside of the planning units. However, it is possible to reconstruct from the total record a general picture of the aboriginal occupation of the El Paso/Red Mountain Planning Units.

POPULATION

There is very little hard demographic evidence for Indian groups in the El Paso/Red Mountain Planning Units. Kroeber (1925:590, 595, 603, 608, 614-615, 617) presented contemporary census data and extrapolated aboriginal populations as follows: (1) Chemehuevi, 1920 federal census estimate of 350 with 260 living in California, and an estimate of a maximum of 1,000 in aboriginal times; (2) Kawaiisu, an estimate of 150 to 500 in aboriginal times; (3) Tübatulabal, 1920 federal census estimate of 100 to 150, and an estimate of up to 1,000 in aboriginal times; (4) Vanyume, estimate of a very small aboriginal population and a reference to Garcés' mention of 65 people in two villages in 1776; (5) Serrano, 1910 federal census estimate of over 100, and an estimate of up to 1,500 in aboriginal times; and, (6) Koso, an 1883 estimate of 150, an 1891 estimate of 100, 1920 federal census estimate of 100 to 150, and an estimate of not more than 500 in aboriginal times. Kroeber is careful to indicate that there is no real basis for his extrapolation of aboriginal populations, although he believes them to be ample. No data is provided by Kroeber on the age/sex breakdown of any of his populations.

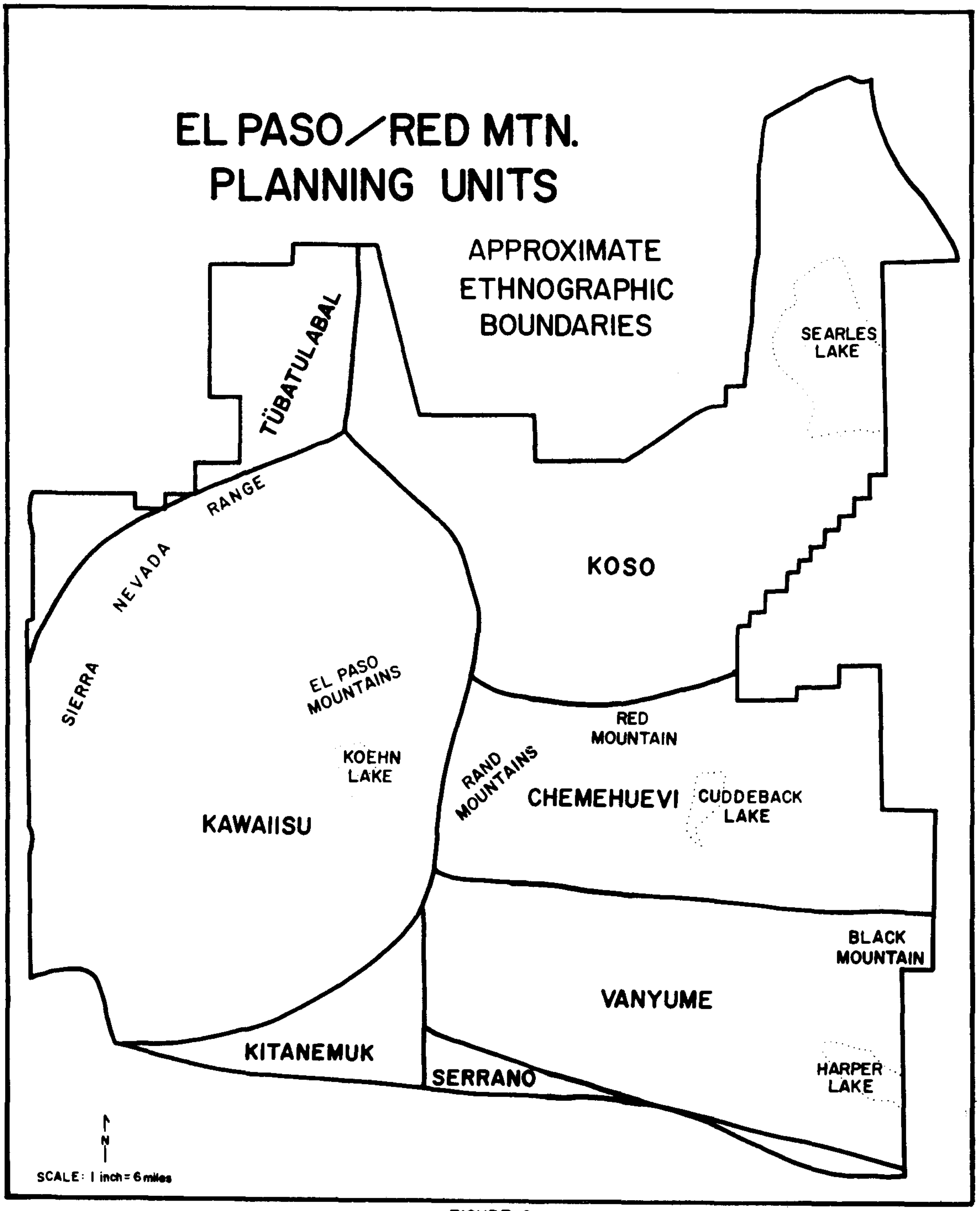

EL PASO/RED MTN.
PLANNING UNITS
APPROXIMATE
ETHNOGRAPHIC
BOUNDARIES
TÜBATULABAL
SEARLES
LAKE
SIERRA
NEVADA
RANGE
KOSO
EL PASO
MOUNTAINS
KOEHN
LAKE
RED
MOUNTAIN
RAND
MOUNTAINS
CHEMEHUEVI
CUDDEBACK
LAKE
KAWAIISU
BLACK
MOUNTAIN
VANYUME
KITANEMUK
SERRANO
HARPER
LAKE
N
SCALE: 1 inch = 6 miles

FIGURE 6

Voegelin (1938) reported that there were 145 Tübatulabal in 1938, and he estimated that the population was between 300 and 500 in aboriginal times. In 1854, Henley (1855) reported a Tübatulabal population of 100 persons. Steward (1933:237) estimated that there were 250 Koso during aboriginal times. However, Coville (1892:352) noted that there were only 25 Koso in 1892, and asserted there were never very many more of this group. Swanton (1952:48) estimated that at the time of Spanish contact there were a combined total of 3,500 Alliklik, Serrano, Vanyume, and Kitanemuk.

The conclusion to be drawn from these vague estimates and partial data is that there was most probably a very low population density for the El Paso/Red Mountain Units as a whole. However, given the resource distribution of the region and the nature of aboriginal exploitation (see Seasonal Round below), undoubtedly there were relatively high population concentrations in the region at specific places during certain times of the year.

HUNTING AND GATHERING

The progression of seasonal movements within the El Paso/Red Mountain Units can be seen as a response to the differential ripening of major plant food resources. Hunting was probably carried out as an adjunct to gathering, and hunting methods appear to have been tailored to the exigencies of plant gathering.

Gathering

The ethnographic record indicates that the most important plant resources for groups in the El Paso/Red Mountain Planning Units was the piñon pine nut (*Pinus monophylla* Torr. & Frem.). Piñon pine occurs as a co-dominant in Piñon-Juniper Woodland areas between 6,000 and 8,000 feet on the eastern slopes of the Sierra Nevada Mountains and on the upper slopes of the Coso Mountains (Ornduff 1974:6, 106). These nuts were harvested in early autumn and formed the basis for the winter diet (Coville 1892:352; Dutcher 1893:377-380; Kroeber 1925:592).

Dutcher (1893:377-380) recorded a detailed description of a Koso pine nut harvest. The Koso pine nut camps were located within the piñon groves near the ecotone between the woodland and the sage communities. They were temporary camps composed of five or six brush and wood windbreaks (Dutcher 1893:377). The nuts were collected by women, using long thin poles to knock the cones from the trees. The cones were then collected in large conical baskets and transported to the camp. In camp, nuts were removed from the cones by placing the cones on a large (6 to 8 ft. diameter by 2 ft. high) slow-burning brush fire (Dutcher 1893:379). This process dried the pitch in the cones and forced the cone scales to open. On the day that Dutcher (1893:380) observed the process, there were about two bushels of pine nuts collected. This yield seems low compared to the 30 to 40 bushels per day estimate that Steward (1938) gives for pine nut collecting in the Owens Valley. However, pine nuts are more plentiful and easier to reach in the Owens Valley than they are in the El Paso/Red Mountain Units. While pine nut use is specifically mentioned only for the

Koso and Tübatulabal (Voegelin 1938), their use and significance can be inferred for the other groups in the area.

The second most important plant resource used during aboriginal times in the El Paso/Red Mountain Units was bunchgrass seeds (*Poa* spp.). Bunchgrass seeds were collected in the spring and represented the major component of diet during the period from the exhaustion of stored winter resources (primarily piñon pine nuts) and the beginning of the piñon nut harvest (Coville 1892:353). Bunchgrasses occur as part of the Valley grassland community and are found on large alluvial plains throughout the area (Ornduff 1974:97). These seeds were collected by women, who beat the seeds free of stalks and collected them in shallow baskets (Coville 1892:353). Either at the time of collection or later in temporary camps, these seeds were winnowed to remove chaff and sifted through wicker-work sieves to remove unwanted stems, chaff, and dirt. The seeds were then ground and re-winnowed prior to cooking.

Other plants used include mesquite (*Prosopis* spp.), digger pine (*Pinus Sabiniana* Dougl.), chia (*Salvia Columbariae* Benth.), thistle sage (*Salvia carduacea* Benth.), cattail (*Typha latifolia* L.), juniper (*Juniperus californica* Carr.), devil's pincushion (*Echinocactus polycephalus* Engelm & Bigel.), beavertail (*Opuntia basilaris* Engel & Bigel.), Mormon tea (*Ephedra* spp.), evening primrose (*Enothera brevipes*), reeds (*Phragmites* spp.), and Joshua tree (*Yucca brevifolia* Engelm.) (Coville 1892; Voegelin 1938).

Hunting

The Koso hunted deer (*Odocoileus hemiones*), mountain sheep (*Ovis canadensis*), antelope (*Antilocapra americana*), jackrabbits (*Lepus californicus*), cottontail rabbits (*Syvilagus* spp.), wood rats (*Neotoma* spp.), Kangaroo rats (*Dipodomys* sp.), mice (*Peromyscus* spp.; *Microtus* spp.), and chuckawalla lizards (*Sauromalus* obesus) (Coville 1892:352). Coville does not discuss Koso hunting practices, although Voegelin (1938) does discuss how these animals were hunted by the Tübatulabal.

Deer and mountain sheep were hunted by individuals or small groups (three to four persons), who either stalked these animals or waited in blinds while the animals were driven to them (Voegelin 1938:12). Near each blind a small space was cleared, and eagle down, tobacco, and beads were offered for a successful hunt (C. Voegelin 1935:219). These large animals were shot with a sinew-backed bow and cane arrow. Voegelin (1938:12) claimed that these weapons were accurate at 600 feet. Wounded game was chased until it collapsed and could be killed. Antelope were sometimes hunted by a small group in which one hunter was concealed behind a rock blind while other hunters drove the antelope to him (Voegelin 1938:13).

It was common for antelope and jackrabbits to be hunted communally. As many as 500 people participated in these communal efforts (Voegelin 1938:13). The usual method of hunting antelope was to space hunters behind rock walls along the rim of a small canyon.

These men then ambushed antelope that were driven up the valley by a line of beaters (Voegelin 1938:13). After the hunt, antelope meat was distributed to all the participants. Rabbits were hunted communally by setting up a line of nets and then setting fire to the brush or beating it to chase the game into the nets (Voegelin 1938:13). At the nets, rabbits were killed with clubs or shot with bow and arrow. Sometimes a secondary net was set up to trap any animals that escaped the first net (Voegelin 1938:13). The catch was distributed to all participants at the end of the hunt. Large communal hunts, either for rabbits or antelope, tended to take place near gathering time for pine nuts. This meant that an already assembled population could be diverted for use in the communal hunts.

Small game was generally captured in small rock fall traps. These traps consisted of a shallow hole (three to four inches deep) over which a rock was balanced. When an animal took the bait, the rock fell and trapped the animal in the hole (Voegelin 1938:13). The animal was not crushed, but only trapped. Trapping was most intense during autumn, when as many as 20 traps were set by an individual and checked every two days (Voegelin 1938:13).

Small willow blinds were constructed near springs.and water sources. From these blinds, birds and small game were shot with a bow and arrow (Voegelin 1938:13). Voegelin reports that lighted torches were used at night to "bring" birds out of trees so that they could be clubbed.

It must be stressed that these hunting methods were reported for the Tübatulabal only. Therefore, the practices of other groups may have varied somewhat, although probably being similar in general.

SEASONAL ROUND

The winter months, from about mid-November to about the end of February, were the time of least food procurement activity in the seasonal round (Voegelin 1938:11). Subsistence during this period was mainly dependent on stored foods, such as pine nuts and occasional supplements of fresh game. Villages were located either on the valley floor or at the base of a mountain in close proximity to a good water source (Coville 1892:352; Voegelin 1938:11). Within the El Paso/Red Mountain Units, an ideal region for winter camp location would have been along the Garlock Fault where it runs along the base of the foothills of the Sierra Nevada Mountains. There were springs along the fault, and its proximity to the foothills would have offered some protection from the elements. Indeed, Kroeber (1925:590) reports that Kawaiisu and Koso settlements were scattered at spots usually in or at the foot of a mountain. If by settlements, Kroeber meant winter villages, then his report is in agreement with the geographic situation.

By the end of winter, stored supplies would have run low or become exhausted. At this time, from about the end of February to about May, winter camps would have begun breaking up and the people would have split into nuclear family units to begin food procurement activities (Voegelin 1938:11). The major resources exploited during this early spring period probably were Joshua tree pods and stalks (*Yucca brevifolia*), mesquite beans (*Prosopis* spp.), and other early spring seeds and tubers. Tule roots, if available, also would have been heavily exploited during this period. Joshua trees occur abundantly in certain portions of the El Paso Mountains. Mesquite occurs on sand dunes around dry lake beds, especially in the dunes at the south end of Koehn Lake. Tule would have occurred in marsh areas, particularly in the vicinity of Little Lake. Therefore, these areas would have been the location of intense early spring food procurement activity.

During late spring and summer, from about May to the end of July, the population would have been at its lowest density because nuclear family groups would be widely dispersed to exploit bunchgrasses (Voegelin 1938:11). Food procurement activity was localized on large alluvial fans, particularly in the area south and east of Red Mountain. Very temporary shelters and very short-term camps would have been characteristic of this period. Because of the replacement of bunchgrasses by introduced grasses, archaeological evidence of these camps and summer activities can be expected to occur in areas which do not now have a bunchgrass cover.

During late summer and autumn, from about August through mid-October, the native population would have begun leaving the grasslands to gather for the piñon harvest (Voegelin 1938:11). The bulk of nut harvesting would have taken place during September and October. The people would have made temporary camps (see Gathering section above) and conducted periodic trips to winter camp locations to store nuts. Most major hunting activities, such as communal rabbit, deer, and antelope hunts would have been carried out during this period. The annual calendar round would have ended by about the middle of November. The population was then at its greatest and most sedentary concentration. Activity again centered on equipment maintenance in winter villages.

STRUCTURES

Koso piñon camps consisted of several circles or corrals built out of a piñon branch framework covered with light brush (Dutcher 1893:379). These circles had walls up to three feet thick and up to three feet high. They were eight to 10 feet in diameter and usually accommodated a single family. Such shelters functioned to secure privacy, break the wind, and hold possessions. There was a small fire in the center of the circle, and the floor was kept smooth and free of weeds and debris.

The only other major structures reported for Koso piñon camps were fire rings, used to open the cones prior to nut removal (Dutcher 1893:379). Such rings consisted of a single tier circle of rocks, about six to eight feet in diameter, in which cones were placed on top of a two-foot-high pile of slow-burning brush. In an archaeological context, cone fire rings should be distinguishable from house remains through an examination of their interior contents. Within a cone fire ring, there should be only ash and carbonized cone fragments, while within a house there should be concentrations of charcoal and artifacts. Kroeber

(1925:591) mentioned that the Koso also used the earth-covered sweathouse. He reported that these were large enough for a man to stand in and were covered by soil that was heaped over a layer of arrowweed (*Pluchea sericea* [Nutt.] Cov.). Unfortunately, he does not provide any more details. It is highly likely that these sweathouses were associated with winter villages, and their remains could be used to classify a site as a winter village.

Voegelin (1938:24) described Tübatulabal winter houses and said that they were all located west of the Sierra crest. He reported that the Tübatulabal summer shelter consisted of a small rectangular four-post foundation with an open front, brush sides, and a brush roof. These were mainly used as shades for women while they were working. There was a small fire in front of these shelters, and they faced east to catch the morning sun.

The Tübatulabal also used the earth-covered sweathouse, and it can be inferred that they were similar to those used by the Koso. Tübatulabal sweathouses were described as consisting of a round hole, four feet deep by 15 feet in diameter, covered by an earth and brush roof (Voegelin 1938:25). This roof was supported by three posts, and a fire was built between the door and the middle post. The roof was high enough so that the men could sit upright around the fire. Sweathouses were located near a stream, spring, or artificial pool, and were associated with winter villages (Voegelin 1938:25).

MATERIAL CULTURE

The Koso and Tübatulabal used a short (up to three feet) sinew-backed bow, made from seasoned juniper wood (Kroeber 1925:59; Coville 1892:359-360; Voegelin 1938:27-28). These bows were strung with either sinew or Indian hemp (*Apocynum* spp.). Coville (1892: 359) reported that these bows were remarkable accurate and had great force on impact. There is no information in the literature on the bows of other groups in the area, although it can be assumed that they were similar to those described for the Koso and Tübatulabal.

Arrows were made from a 3.5-foot length of either willow or cane (*Phragmites* spp.) (Voegelin 1938:27-28; Kroeber 1925:59; Coville 1892:359-360). These shafts were straightened on a heated stone shaft straightener which had two grooves (Coville 1892:359-360). The Koso used three half-feathers, and these were bound to the notched end by sinew (Coville 1892:359-360).

Neither Kroeber (1925) nor Coville (1892) reported the Koso as using stone arrow points. However, Coville (1892:360) does say that stone points were formerly used for war and large game hunting. The Koso did use wooden foreshafts. These were made from five-inch lengths of sage or greasewood tapered to a blunt point (Coville 1892:360). Tübatulabal stone points were made from obsidian and a bluish grey rock (Voegelin 1928:28). These materials were collected from the Mount Whitney area, from Coso, and from the Tejon area near Mojave (Voegelin 1938:28). The points were made in various shoulder shapes by chipping the material with a deer bone awl. The points then were attached to the arrows with asphalt (Voegelin 1938:28).

There was no reported use of ceramics in the planning units, but there was extensive use of basketry. Basket-making materials were willow (*Salix lasiandra* Benth.), aromatic sumac (*Rhus trilobata* Nutt. ex. T. & G.), devil's horn (*Martynia probascidea*), yucca roots (*Yucca brevifolia* Engelm.), and a tall grass (*Muhlenbergia rigens* [Benth.] Hitch.) (Coville 1892:358-359). These materials were made into baskets using coil techniques as well as weaving techniques such as twining and wicker. Baskets were used as packs, cooking pots, storage vessels, seed beaters, cooking trays, water containers, and sifters (Coville 1892:357-359; Kroeber 1925:59; Dutcher 1893:378-379; Voegelin 1938:31-33).

The Tübatulabal used both the mortar/pestle and the mano/metate (Voegelin 1938:17). Pit mortars (two to 10 inches deep by three to five inches wide) were located on level, gently sloping granite bedrock outcrops. Portable mortars (six to 35 inches in diameter) were pecked out of soft stone with a pointed rock. These were transported to the piñon camps. Large portable wooden mortars were made from a cylinder of oak or juniper by burning out the center and smoothing the hole with rocks. In all of these mortars, a cylindrical granite or slate pestle was used. These pestles were not shaped, but were selected from the stones in a stream bed. Metates were oval or rectangular slabs of granite or black slate. They were generally 14 to 20 inches long by 10 to 15 inches wide by two to four inches thick. Through use, metates developed a flat or slightly concave surface. Metates were portable and when not in use were stored next to the wall of a house. A basketry hopper was attached to the working surface of a metate to prevent flour from spilling. There were both large and small manos, but both tended to be thick with a flat top and bottom.

Voegelin (1938:35) noted, but did not describe, the steatite bowls, tubular pipes, whistles, flutes, musical bows, and bullroarer used by the Tübatulabal. Most probably, arrowshaft straighteners were made from steatite. Coville (1892:352) noted that the Koso used a wooden mortar in plant processing, but he did not describe it. Obsidian was also reportedly used for knives, scrapers, and spear points, but these artifacts were not described (Voegelin 1938:28).

TRADE

There was extensive trade between the groups within the El Paso/Red Mountain Units and Indian groups located on the coast and in the Colorado River area (Farmer 1935:155-157; Walker 1937:189-194; Sample 1950:1-30; Kroeber 1925:589-592; Ruby 1970). This trade system can be separated into two types: (1) a limited trade between coastal and El Paso/Red Mountain groups in which goods traded were intended for local consumption; and, (2) an extended trade between the coast and the greater Southwest, with the El Paso/Red Mountain groups acting as middlemen. In the latter type of trade, goods did not stay in the local area.

In the localized trade, the major activity seems to have been between the Koso and Kawaiisu on the desert side of the Sierra Nevada and the Yokuts on the Central Valley side (Kroeber 1925:591; Walker 1937:193; Sample 1950:19). However, there was some local trade between the Owens Valley and groups in the planning units area and between the Tübatulabal and the Chumash (Sample 1950:4, 19; Voegelin 1938:28). The trade centered on exchanging local goods such as piñon nuts, dried meats, salt, cryptocrystalline rock, and basketry materials for steatite beads, steatite, shell beads, raw abalone shell, asphalt, feathers, fish, feather bands, ceremonial eagle down skirts, and baskets (Kroeber 1925:591; Walker 1937:194; Voegelin 1938:52; Sample 1950:19). The trade between the Owens Valley and the Tübatulabal is indicated by the reference in Voegelin (1938:28) to the Mount Whitney area as an obsidian source.

On the basis of this limited ethnographic data, it has been argued that, in general, east/west trade was more common and important than was north/south trade (Sample 1950:5). This differential emphasis is usually attributed to the greater east/west variation in environmental factors (Sample 1950:5).

The other trade, which extended from the Pacific Coast to the greater Southwest, is not as well documented in the ethnographic literature. In 1776, Garcés was guided from the Colorado River to the Central Valley by Mohave Indians who said that they regularly made such trips to trade for shell. They made this trip in four days. Garcés reported that the Mohave stopped at the edge of the Central Valley and refused to go north because they were afraid of the Indians in the valley (Sample 1950:4-5). Sample (1950:4-5) interpreted this hesitation to mean that the Mohave did not regularly trade with the northern groups, but used groups in the El Paso/Red Mountain Units as middlemen. In another early account, Font said that the Mohave regularly traded with the Serrano and Indian groups along the Santa Barbara channel. Both of these early accounts indicate that the Mohave were heavily involved in the Coastal/Southwestern trade and that El Paso/Red Mountain groups were also involved as middlemen (Sample 1950:5). The major trade items seem to have been Southwestern pottery and Pacific shells and shell beads (Sample 1950:5). An archaeologic investigation of this trade (Ruby 1970:160-167) reached essentially the same conclusion, i.e., that Coastal/Southwestern trade was the result of a series of peaceful, reciprocal exchanges of shell for ceramics between trading partners from both areas. Ruby (1970:161) argued further that shell moved indirectly through intermediary Mojave desert groups, while Southwestern goods moved both indirectly and directly.

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A CULTURAL SEQUENCE FOR THE EL PASO/RED MOUNTAIN PLANNING UNITS

INTRODUCTION

Over the last 20 years, American archaeology has undergone self-evaluation and a reorientation of goals. Whether the resultant changes reflect a revolution in archaeology, i.e., the "new archaeology" (Morwood 1975), or simply a more rapid rate of change is a moot issue; a transformation has begun and continues to develop (Leone 1972). For example, it has been advocated by Binford (1962, 1964, 1965, 1968a, 1968b) and others that the ultimate goal of the "new archaeology" is the formulation of laws of cultural process—attained by the explication and explanation of cultural similarities and differences. This goal is presumably divorced, for instance, from the more traditional, or normative, archaeological concern with reconstruction of culture history (Deetz 1970:115). Yet it has been concisely argued that both historical and processual approaches are useful and mutually dependent (Flannery 1967), and that there are not two archaeological strategies (Thompson 1972). In other words, fruitful research can most profitably occur when recent innovations in method and theory are coupled with essential and established practices. It is in this context that the bulk of information presented below falls into the category of culture history. This "elementary data" (Thomas 1970:54) is provided for the simple reason that a chronology of prehistoric cultural activities, an initial step in archaeological endeavors, for the El Paso/Red Mountain Planning Units has yet to be constructed on the basis of research within the defined territories. Further, by organizing the material in terms of a cultural sequence, a temporal context can be suggested which serves as a backdrop in the formulation of possible research questions focusing on cultural processes (see Meighan n.d.; Trigger 1970).

Although there are several published accounts of cultural material discovered in the planning units, these reports are limited in usefulness for any broad discussion of culture history. Therefore, this report of necessity relies primarily on the comparatively more extensive information generated from investigations in adjacent localities. Of particular interest in the structuring of culture history within the El Paso/Red Mountain Planning Units is the sequential pattern of projectile point types in the Great Basin (see Lanning 1963; Clewlow 1967; O'Connell 1967; Hester 1973; Bettinger and Taylor 1974). Lithic points can effectively serve as criteria with which to temporally and spatially organize cultural remains because of their durability and their often diagnostic variability in size, weight, form, and material (cf. W. Davis 1966:151; Swanson and Sneed 1966:24; Clewlow 1967:143; Roust and Clewlow 1968:103; Walter 1970:50). In essence, a projectile point type is "an artifactual construct" based on morphology and inferred function (Wormington 1957:2; Irwin and Wormington 1970:25). Ideally a type shall "have demonstrable historical meaning in terms of behavior patterns" (Krieger 1944:272; e.g., Black and Weer 1936). The main difficulty here, however, is that there are no published absolute archaeometric data for either general cultural manifestations or certain artifact forms within the El Paso/Red Mountain Planning Units. Obviously then, the reader must be cautioned to view the following presentation only in its most general sense and not to be disturbed by the large role that inference shall implicitly perform.

Archaeological research in the El Paso/Red Mountain Planning Units is hardly sufficient to warrant treatment in a separate section, thus the following brief summary is provided. The Black Canyon-Black Mountain area in the southeast corner of the Red Mountain Planning Unit has been studied by various members of the Archaeological Survey Association of Southern California, whose observations have been published in the ASA *Newsletter* and in the *Masterkey* (Southwest Museum). Petroglyphs have been a common subject of these reports (Peck 1953; Pederson 1956; Gruber 1961), and archaeological remains, except in a few cases, have been more or less casually described (Simpson 1952b; F. Curtis 1955, 1956). Schwacofer (1946) has also written about Black Canyon petroglyphs. Petroglyphs in the southern Argus Range have been described by Johnston (1933). In the El Paso Mountains, casual remarks about the archaeology of this locality were given by Starry (n.d.), Perison (1956), and Lawbaugh (1950). Apostolides (1968) provided the only published data on excavation in the study area, reporting on artifacts recovered from several small, probably late-dating rockshelters in the El Pasos' Last Chance Canyon. It should be noted that Apostolides has done a large amount of reconnaissance in the El Paso Mountains and that when his data become available a more substantial assessment of prehistory in the area will be possible. Hillebrand (1972) has also conducted several surveys in the El Pasos, one in conjunction with Apostolides. W. Bliss has headed several San Fernando Valley State College archaeological field classes around Harper, Cuddeback, and Koehn Dry Lakes (Hanks 1968, 1970). The Harper Dry Lake survey resulted in the collection of artifacts indicative of a long culture history in the area (Hanks 1968). G. Smith's (1963) compilation of San Bernardino County Museum records on sites in the Mojave River drainage system included several isolated incidents of artifacts found within the study area. In the mountains bordering the El Paso Planning Unit on the west, a small rockshelter near Walker Pass dating from the late prehistoric and early historic was excavated by Harrington (1950). Sherds of Owens Valley Brown Ware have been collected by Heizer (1952) and Griffin (1963) in places east of Kelso Valley.

As the El Paso/Red Mountain Planning Units fall within the southwestern limits of the Great Basin, this report adopts the general temporal scheme for the Great Basin proposed by T. R. Hester (1973). To date, Hester's presentation and synthesis of Great Basin chronology is by far the most explicit statement available on culture history and is particularly suitable as it is done by area. Hester's ordering of prehistory in the southwestern Great Basin (1973:Fig. 25) will be examined in the light of what meager evidence exists for the study area, and with respect to data from the following surrounding localities: northern Tehachapi and southernmost Sierra Nevada mountains, China Basin, Coso Mountains, Little Lake and Owens Valley, Panamint Valley, Panamint Mountains, Death Valley, the greater Mojave Desert, and the Colorado Desert. Where pertinent, archaeometric and typological data from other areas within the Great Basin will be drawn upon. This is done for two reasons: (1) it might be expected that future archaeological investigators of either planning unit would consult the listed references; and, (2) at least some of the results of these future studies would be expected to correspond to those already made by other archaeologists in the Great Basin.

The format below essentially follows that of Hester (1973) except that a discussion of pre-projectile point cultures has been added and Hester's tentative suggestion of an occupational hiatus in the southwestern Great Basin (ca. 6,000-4,000 B.C.) has been omitted for reasons outlined in the section under Great Basin Archaic (Fig. 7).

PRE-PROJECTILE POINT CULTURES

The possible existence of "pre-projectile point" or equally ancient cultures in the New World has developed into a vexing problem that remains far from resolution (cf. Morris-Gell 1969:351). Among notable advocates of such a culture stratum are Krieger (1962, 1964), Willey and Phillips (1955, 1958), MacNeish (1958, 1961, 1962), Jennings (1964), Irwin-Williams (1967, 1968a), and Cressman (1968). The technical sophistication of the earliest well-defined projectile point in the Americas—the Clovis—"leads most archaeologists to believe that there must have been developmental stages of this unique style in the western Hemisphere, and therefore, there must be earlier cultures as yet undiscovered in the Americas". (Agogino 1968:1). Furthermore, an apparent tendency among the archaeologists to equate initial New World populations with the earliest documented projectile point forms may be a factor in the absence of recognized pre-projectile point cultures (Krieger 1964:23; cf. Jennings 1957:265). Pre-projectile point proponents assume that points were not included in the tool-kits carried by peoples utilizing the Bering Land Bridge. Although there is little evidence with which to counter this assumption (Agogino 1968:2), a few authors have suggested alternative scenarios for the appearance of points in the New World (e.g., Haynes 1964; Epstein 1966; cf. W. Davis 1966:154). Aside from Krieger's postulated age of 35,000 to 40,000 B.P. for a "Pre-Projectile Point Stage (1964:68), and the probable presence of man in central Mexico ca. 20,000-35,000 B.P. (Irwin-Williams 1968a:40), evidence of very early cultures in the New World remains undatable and for the most part questionable (cf. Haynes 1969:712; Hester 1973:123).

In the Desert West of North America (Jennings 1964:Fig. 1), discussion of early man "runs the gamut" from the "cautious, scientific, conservatism" of Baumhoff and Heizer (1965), and Heizer and Baumhoff (1970) to the "less guarded, or more expansive, thinking" of Jennings (1964), Cressman (1960), and C. Borden (1968) (Tuohy 1970:146). More importantly, despite the fact that evidence of the earliest Americans is rarest in the Desert West (Jennings 1964:151; W. Davis 1966:152), the "most vociferous claims of man's great antiquity in the New World emanates from the deserts of southern California" (Hester 1973:59). Three of the principal localities involved are the Manix Lake area (which includes Troy Dry Lake, Afton Canyon, and Coyote Basin), Coyote Gulch, and the Calico Hills. These localities are immediately southeast of the Red Mountain Planning Unit, and provide data, albeit highly speculative, on possible early occupation of the planning units (e.g., Gros 1956:6).

The Manix Lake area has been investigated primarily by R. Simpson (1952a, 1956,

CULTURAL SEQUENCE:
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	Southwestern Great Basin	Local Phase Name	Diagnostic Artifacts
	LATE PREHISTORIC	Early Mohave Death Valley IV Early-Late Cottonwood Marana	Pottery Cottonwood points Desert Side-Notched points
1000	ROSE SPRING/ EASTGATE COMPLEX	Amargosa II Death Valley III ? Late Rose Spring Haiwee	Rose Spring points Eastgate points
AD BC 0 1000 2000 3000 4000	GREAT BASIN ARCHAIC	Early Milling, Archaic Transition Little Lake and Newberry Early-Middle Rose Spring Death Valley II Pinto Basin	Grinding tools Elko points Gypsum Cave points Pinto/Little Lake pts. Humboldt points Silver Lake points
5000 6000	scanty occupation ?	none definite	Silver Lake points?
7000 8000	WESTERN PLUVIAL LAKES TRADITION	Western Lithic Co-Tradition Death Valley I Lake Mohave Complex San Dieguito Complex	Silver Lake points Lake Mohave points Crescents/Transverse points
9000 10000	FLUTED POINT ? TRADITION	Fluted Co-Tradition	Folsom points ? Clovis points
	PRE-PROJECTILE POINT CULTURES ?		choppers teshoa flakes scraper planes

FIGURE 7

1958, 1961, 1965). Simpson's original evaluation led her to the conclusion that so-called "core-and-flake tool sites" found on recessive shorelines of this pluvial basin represented a "basic, generalized culture horizon" predating the Lake Mohave complex (Campbell *et al.* 1937), and falling somewhere between 8,000-10,000 B.C. (1952a:63; see H. Curtis 1954:3). The most abundant "Early Paleolithic-like material" (i.e., heavy, crude uniface-biface tools, choppers, scrapers), situated on slopes and hill tops south of high desert pavement sites, were given an age of greater than 20,000 years (Simpson 1958:8-9). Hester reports that in 1960 Simpson obtained radiocarbon dates of 15,390 B.C. ± 400 (UCLA-121) and 15,590 B.C. ± 400 (LJ-269) on tufa samples collected just below the high stand line of the pluvial lake (1973:59). Simpson postulated a "Manix Lake Lithic Industry" on the basis of the distinctiveness of a "scraper-chopper-coup de poing-like assemblage" (1960:27). Also included were hammerstones, "Clactonian flakes," pointed tools, bifacially and unifacially worked tools, and utilized flakes (Simpson 1960:33-35).

Simpson has also investigated the Coyote Gulch area located between Black Canyon and Coyote Basin (1961). As with most early sites in the southern California deserts, the Coyote Gulch sites were all surface occurrences (Simpson 1961:12). Cores, bifacial core tools, a variety of scrapers, flake perforators, and pointed tools were recovered (Simpson 1961:17). Interestingly, 350 of the 993 specimens collected were later eliminated from the artifact category, 522 were designated "shapeless or atypical," and only 121 were listed as definite artifacts (Simpson 1961:13). The "shapeless or atypical" items corresponded well with MacDonald's observation that a prominent aspect of Paleo-Indian technology was the large proportion of tools fashioned from irregular flakes with only a minor amount of retouch modification (1966:65). As to the age of the materials, Simpson (1961:34) placed the Coyote Gulch sites in "later Pluvial times" based on evidence:

> . . . from Early Paleolithic-like sites in Wyoming (Renaud 1936, 1938, 1940) and on the records of classic Old World stations . . . the Coyote Gulch artifact assemblage may be assigned to a stage typologically similar to the later portion of the Old World Lower Paleolithic.

There is little doubt that at least some of the Manix Lake and Coyote Gulch finds represent early occupations in this area of the Mojave Desert, but there are several drawbacks to acceptance of Simpson's postulated dates. First, there is no assurance that remains found on pluvial lake terraces can be securely linked to geologic or relict hydrologic features determined to be of a specific age (cf. Tuohy 1970:147; Hester 1973:59). Second, to infer typological similarity of local artifacts and artifacts removed at a great distance, and then to estimate an age of local material on the basis of this tenuous connection may be a grave mishandling of the data and "harkens back to the time in the late 19th century when quarry and workshop materials in the eastern United States were being attributed to 'Paleolithic' because of their morphological similarities to ancient specimens in Europe" (Hester 1973:60). Third, many of Simpson's finds are probably "quarry blanks," rather than representatives of an ancient culture. Blanks occur frequently in more recent sites, and there is limited criteria to distinguish older from younger blanks (cf. Wallace 1962:174).

The extremely aged artifacts reported in the Calico Hills have been the subject of much doubt and debate in recent years. Prior to 1964, artifacts similar to Simpson's "Manix Lake Lithic Industry" were noted on eroded alluvium ridges in the eastern Calicos (B. H. McCown 1954; Simpson 1960). Since 1964, Simpson in collaboration with the late L. S. B. Leakey and T. Clements have conducted excavations in a gravelly alluvial fan with a probable age of 400,000-120,000 B.P. (Leakey, Simpson, and T. Clements 1968:1022; T. Clements 1970b:2). A total of 170 supposed artifacts have been taken from the deposit, and are, by geologic inference, dated 50,000-80,000 B.P. (Leakey, Simpson, and T. Clements 1968:1022; T. Clements 1970a:2; T. Clements 1970b:2; cf. Simpson 1969). Paleomagnetic data on a presumed "hearth" at the site supporting the dates were discussed by R. Berger at a conference on the site in 1970 (T. Clements 1970b:2).

Although the Calico finds are provocative, most archaeologists are reluctant to accept the basic premise that the stone specimens were modified by human hands, much less that the cluster of burned rocks constitutes a hearth (cf. Irwin 1971:45). Haynes (1969:713) suggested that:

> [The] . . . main difficulty [with the] . . . situation there [at Calico] does not lend itself to definitive solution. The question is whether the flints are of archaeological or of geological origin, but as with 'eoliths' the two could be indistinguishable at very early levels and under geological conditions where natural flints are a significant component of the deposit.

Moreover, Hester (1973:59) stated in regard to the Calico specimens:

> . . . most believe that they are of natural manufacture–fortuitously chipped pieces picked (or better, *selected*) from among hundreds of thousands of fractured gravels in the alluvial fan . . . If man was actually in this region at such an early time, much better evidence will have to be found [Hester's emphasis].

E. L. Davis (1970:Table 11) suggested that there may possibly be some unrecognized early hunter-collectors ca. 10,000-40,000 B.C. in Panamint Valley. The limited evidence includes a few choppers, chopping tools, and crude, heart-shaped knife/points. Davis (1970:117) noted that these artifacts are "much more heavily patinated than their neighbors within a single pavement" (see also L. Clements 1956).

An early occupation, at least 20,000 B.P., has been argued for Death Valley (Clements and Clements 1953; L. Clements 1954, 1955). A collection of 500 pieces of chipped stone are described as crude scrapers, knives, choppers, drills, and microliths. Although a Pleistocene inhabitation of Death Valley cannot be summarily dismissed, one cannot rely too heavily on the Clements' collection as evidence; most of these specimens, if not all, are probably products of natural processes (cf. Wallace 1958:10, 1962:174; Hester 1973:59).

Further evidence of pre-projectile point cultures in southern California deserts may come from the Colorado desert, although the definition and dating of these remains have yet to be widely accepted by archaeologists (cf. Weide and Barker 1974:76). Rogers (1939:6-24) suggested the term Malpais to represent these early remains, based on a lithic industry he located on the surface of the lowest terrace along the Colorado River. Weide and Barker (1974:76) provided a succinct summary of supposed Malpais artifacts as indicated by Rogers (1939, 1950, 1958); noting that they were:

> ... represented by simple lithic forms chipped by stone on stone percussion. The bluk of the pieces are primary flakes including teshoa flakes, struck from the unprepared shoulders of cobbles, and flakes in which the striking platform is a flake scar and whose exterior face reveals the scars of previous flakes removed from the core. Choppers, scraper planes and ovate bifaces may also be found.

Rogers (1939:Pl. 21) originally estimated the age of the Malpais Industry at 2,000 B.C. In subsequent articles, Rogers (1950, 1958) recognized it as the earliest form of San Dieguito, renaming it San Dieguito I to emphasize its inclusion within the San Dieguito Complex (Warren and True 1961:273). Before his death, Rogers accepted a possible date of ca. 6,000 B.C. (Warren 1966:18).

The basic problem with Malpais Industry-San Dieguito I is one of definition, consequently its chronological significance is difficult to assess. Rogers (1939:70) noted a lack of conformity in Malpais artifacts. Later, Rogers (1958:9) wrote: "This lack of conformity within a class is a typical San Dieguito trait in the first place. Convention is not present and individualism is rampant." Warren (1967:171) in a discussion of the San Dieguito Complex felt that there was insufficient evidence to link Malpais and San Dieguito I into a single cultural unit, and preferred to delete San Dieguito I and retain Malpais as a separate complex:

> Malpais (San Dieguito I) is thus defined by a series of artifacts which show little stylistic patterning, have wide temporal and areal distribution, are from widely scattered sites which were often occupied or utilized by peoples of other cultures, and which are temporally placed on the basis of high degree of chemical alteration on the flake scars. These criteria hardly seem sufficient for the definition of a cultural unit [Warren 1967:170].

Moreover, Harner (1955) tested the very assumption that Malpais materials are even artifacts by subjecting them to thermal-fracturing experiments. In certain instances, fire-fracturing did duplicate Malpais characteristics but not all characteristics could be reproduced (Harner 1955:42). Perhaps, a more significant observation that Harner (1955:42) made was that Malpais materials are essentially indistinguishable from much of the waste chipping that normally occurs in lithic industries, which supports the idea of wide temporal distribution (cf. Wormington 1957:164). Hence, until more evidence can be accumulated and compiled, reference to Malpais can be regarded only lightly in terms of culture history.

An expected characteristic of pre-projectile point cultures in western North America, if they did indeed exist, would have been a lack of a specialized economy (Warren 1967:182). Small groups, each consisting of a few related families, would have "pursued an unspecialized hunting and collecting lifeway, moving frequently from one camp to another within a loosely bounded area with which they were highly familiar" (Weide and Barker 1974:78). Food procurement would have involved gathering of such resources as seeds, greens, fruit, insects, and grubs. Small game could have been trapped, driven, or simply caught by hand. Large game may have been bagged on occasion, or opportunistically taken when a beast had been caught in a bog or severely wounded by some non-human agency.

In conclusion, although there have been no published accounts of possible pre-projectile point cultural remains in the El Paso/Red Mountain Planning Units, the numerous reports of such findings in nearby areas suggest that the discovery of similar materials in the study area would hardly be surprising. This is strengthened by the fact that the large proportion of supposed early man evidence in southern California deserts occur in the vicinity of relict water sources. The El Paso/Red Mountain Planning Units encompass or abut several basins which are associated with Pleistocene pluvial activity–specifically Koehn, Rogers, Cuddeback, Harper, Searles, and China basins (Blanc and Cleveland 1961b:5)–all of which could have played an important role in late Pleistocene or early Holocene occupation of the area.

FLUTED POINT TRADITION

Fluted projectile points have been found throughout the Great Basin, most frequently in western and southern Nevada and in southeastern California (Warren and Ranere 1968:9; Hester 1973:123). Many of these artifacts are typologically similar to Clovis (Sellards 1952) and Folsom (Roberts 1935, 1936) projectile points of the Great Plains and Southwest. Folsom points are considered as the "fluted-point step-child of the Clovis tradition" (Stuckenrath 1966:77). Although there are only two published accounts of fluted points in the El Paso/Red Mountain Planning Units, in the El Paso Mountains (Hillebrand 1972b:48), and at Searles Lake (Warren and Ranere 1968:9), such implements are far from uncommon in surrounding regions (cf. E. Davis 1968b:44). Fluted points have usually been discovered along post-Pleistocene lake shores or in mountain passes connecting these ancient water sources (Tadlock 1966:664; E. Davis and Shutler 1969:156).

E. Davis has recovered fluted points from the northwest portion of China Basin and just west of China Lake proper (E. Davis and Shutler 1961:163; E. Davis 1973:2, Fig. 2, 1975:44). The basal half of a large Clovis point was discovered in the Tehachapi Mountains (Meighan, personal communication to Riddell (F. Riddell and Olsen 1969:128; see also Glennan 1971:30-31). Fluted points have been found at Little Lake (Warren and Ranere 1968) and all around Owens Lake (Amsden 1937; Campbell 1949; E. Davis 1963; Bryan 1965; Walter 1970). Similar points have also been found in Panamint Valley (E. Davis 1970) and at Death Valley I sites (Hunt 1960). East of the study area fluted points have been collected in Pilot Knob Valley (Amsden 1937), in Tiefort Basin (E. Davis and Shutler 1969), and at Lake Mojave (Amsden 1937; Rogers 1939; Simpson 1947; E. Davis and Shutler 1969). It should be noted that in the Lake Mojave report, though unwilling to postulate that the basin "has its Yuma-Folsom horizon," Amsden included eight points under this typological heading (Amsden 1937:85, Pl. 44a-h). "Yuma" points (named for the Colorado county in which they were first found) were originally attributed to people who, as did the producers of Folsom points, hunted bison now extinct. Yet, as Wormington (1957:103) pointed out:

> This category [Yuma] became a catchall in which to place any well-flaked point that was unfluted and lacked the notches and barbs that characterize many more recent types . . . Much nonsense continues to be written about a 'Folsom-Yuma Complex' although there is now ample evidence that a number of complexes are represented in the so-called Yuma category, and not one of these has been shown to be directly linked with Folsom.

The term "Yuma" was dropped out altogether, and points previously known as Eden Yumans and Scottsbluff Yumans became known as simply Eden and Scottsbluff, and Oblique Yumans were left unnamed (Wormington 1948). Eden and Scottsbluff forms have become accepted as manifestations of the Cody complex of big-game hunting tradition complexes in the Plains (Willey 1966:47). The five specimens from Lake Mojave designated as Yuma by Amsden (1937:Pl. 44a-e), as well as Hunt's "Yuma" type from Death Valley (1960:36, Fig. 7e), bear little resemblance to Eden or Scottsbluff points or to Oblique Yumans. A reanalysis of these finds, if possible, would be helpful and may prove significant. Fluted points are also not uncommon in the Mojave Desert (Amsden 1935; B. H. McCown 1954; Brott 1966; E. Davis and Shutler 1969).

The difficulties involved in assessing the chronological significance of fluted points in southeastern California and the western Great Basin are many. While a primary problem has been, of course, cultural identity, spatial and temporal relationships are equally ill-defined (Brott 1969). Thus, most archaeologists show a reluctance to perceive these distinctive artifacts as representatives of an early far western "assemblage" (Warren and Ranere 1968:8; see also Wilke, King, and Bettinger 1974). Another obstacle in analyzing the situation is the fact that fluted points are almost exclusively surface occurrences (Hester 1973:62; Warren and Ranere 1968:9). Although fluted points in the western Great Basin are thought of as more or less coeval with their counterparts in the Plains and Southwest, ca. 8,000-10,000 B.C. (Meighan 1963; Haynes 1964, 1969; Byers 1966; Tuohy 1968, 1974; Meighan and Haynes 1968, 1970a, 1970b; E. Davis and Shutler 1969; E. Davis 1970), possible association of Great Basin fluted points with material attributed to younger dates precludes easy acceptance of datings based on typological similarity. For example, certain crescentic-shaped artifacts or Great Basin Transverse Points (Clewlow 1968:48) are often found in apparent association with fluted points (E. Davis and Shutler 1969:156), yet crescents date to 7,000-5,000 B.C., and perhaps earlier (Tadlock 1966:672-673). Considering that fluted points are usually surface finds, "it remains for future research to firmly establish both their temporal span and cultural association in the Great Basin" (Hester 1973:62).

A major element in the interpretation of fluted points in southeastern California and the western Great Basin is the controversy over whether these artifacts are manifestations of an early big-game hunting tradition analogous to the big-game hunting complexes defined for the Plains and Southwest. The debate revolves around the question of inferrable association of fluted and other early point forms with extinct megafauna, an association which has yet to be stratigraphically demonstrated in the Great Basin (Wallace 1962:173; Baumhoff and Heizer 1965:699; Heizer and Baumhoff 1970:1; Hester 1973:62). Proponents of big-game hunting have had to contend with skeptical attitudes on the part of many archaeologists fostered by previously proven spurious claims of man-megafauna associations at, for instance, Gypsum Cave and Tule Springs (Graham and Heizer 1967; Shutler *et al.* 1967; Shutler 1968b; Heizer and Berger 1970). These attitudes are effective, not as deterrents to substantive discussion of early economies in the Great Basin, but as controls on putative associations such as was the case with Harrington's (1933) investigation of Gypsum Cave. Others have felt, however, that these attitudes have done more harm than good (cf. Meighan 1959a; Cressman 1966). Tuohy (1968:31), for one, believes that:

> . . . statements denying the existence of early man as a hunter in the Great Basin (Jennings 1964:151; Heizer 1964:120-121) have served to inhibit the study of Great Basin culture history and to impair the development of Great Basin culture theory.

Tuohy (1968:31, 35) prefers to perceive a "free roaming, big-game hunting" pattern in the western Great Basin, and believes that big-game hunting camp associations with ancient lake shores in the western Great Basin were correctly identified by the Campbells (cf. Amsden 1937:90). On the other hand, belief in a "free roaming, big-game hunting" pattern is seen by Heizer and Baumhoff as "a statement of faith and not of fact" (1970:1). Although Heizer and Baumhoff (1970:7) do not discount the possibility of such a subsistence pattern, "the close association of transverse points and early projectile point forms such as noted by Clewlow (1968), Tuohy (1968), and Shutler and Shutler (1959) with lake basins seems to hint at a lacustrine rather than a big-game hunting economy in the western Great Basin about ten millennia ago." Furthermore, no case can be made at present for big-game hunting having occurred at Lake Mojave on the basis of megafaunal remains.

So what is to be said? Was early man in the western Great Basin primarily a big-game hunter or was he primarily adapted to lacustrine resources? Even more so, can the assumption be made that the makers of fluted points were one and the same as those manufacturing crescents/transverse points and other tools presumably tied in with lacustrine exploitation? Warren and Ranere (1968:16) saw fluted points as evidence that "small hunting parties [were] penetrating the region in some number," while E. Davis (1975:52) suggested that such early materials are parts of total assemblages. Ultimately perhaps, as is so often the case in archaeology, if man-megafauna associations can be shown in at least a few incidents (e.g., China Basin), a "compromise of data" of sorts will be reached in which certain localities of the western Great Basin are seen as expressing varying degrees of big-game hunting and/or lacustrine adaptation. While fluted points in the areas discussed suggest "typological contemporaneity" with counterparts in the Plains, until more evidence is gathered this "does not necessarily mean that similar subsistence patterns were being followed in both areas" (Hester 1973:62). Moreover, "nothing stands against the possibility that the fluted points thus far found in the western Great Basin were used to kill anything but 'microfauna' " (Hester and Baumhoff 1970:7).

Future archaeological research in the El Paso/Red Mountain Planning Units--assuming that fluted points will be found at least in a few instances—would benefit the general interpretation of fluted point occurrences in the southwestern Great Basin. A helpful line of endeavor would be analysis of fluted point distribution with respect to hydrologic features such as Searles, Rogers, and Harper dry lake beds. Although the cultural significance of fluted points in the Desert West may remain an analytical problem for years to come, finding of such implements in the study area would aid the clarification of problems. The discovery of fluted points in apparent associations with materials attributed to later periods (i.e., Western Pluvial Lakes Tradition), may help in the general question of whether certain putatively early Great Basin lithic implements are classifiable as discrete chronological and/or functional entities, as many archaeologists have thus far assumed, or whether these tools reflect a general, temporally-deep multi-component assemblage whose constituents received varying degrees of emphasis in different areas of the Great Basin.

WESTERN PLUVIAL LAKES TRADITION

The Western Pluvial Lakes Tradition was defined by Bedwell (1970:231) as "a general way of life directed toward the . . . exploitation of a lake environment," and he assigned a temporal range of ca. 6,000-9,000 B.C. to the tradition based on research in Fort Rock Valley, Oregon. This tradition effectively encompasses a number of early lithic assemblages in the Great Basin associated with pluvial lakeshores (Hester 1973:62). In the southwestern Great Basin, the Western Pluvial Lakes Tradition is represented by the Lake Mohave/San Dieguito complex (Mojave Desert, Death Valley, Owens Valley) and the Western Lithic Co-Tradition (Panamint Valley).

Lake Mohave projectile points have been noted in the El Paso Mountains by Hillebrand (1972b:48), and E. Davis recorded a site near Freeman Gulch in 1961 that contained Lake Mohave and Silver Lake points (Hanks, personal communication). The authors have reviewed photographs of Lake Mohave and Silver Lake points reportedly found on the west side of Black Mountain (in the El Pasos) and near Walker Pass by a local collector. Lake Mohave points were found in Black Canyon in the southeastern portion of the study area (Simpson 1952b:141). South of Black Canyon, a possible Silver Lake point was recovered at Harper Dry Lake (Hanks 1968:24).

In areas adjacent to the El Paso/Red Mountain Planning Units, Lake Mohave and Silver Lake points are common occurrences: at China Lake (E. Davis 1973, 1975), in the Little Lake-Owens Valley vicinity (Harrington 1948, 1957; Campbell 1940; H. Riddell and Riddell 1956; Lanning 1963; E. Davis 1964; Bryan 1965; Walter 1970), in Panamint Valley (E. Davis 1970), in Death Valley (Hunt 1960; Wallace 1958), and throughout the Mojave Desert (Campbell and Campbell 1935; Campbell *et al.* 1937; Rogers 1939; Lawbaugh 1952; Simpson 1960; J. Davis 1962; G. Smith 1963; Donnan 1964; True, Davis, and Sterud 1966).

The Lake Mohave complex initially was defined by the Campbells (Campbell *et al.* 1937) on the basis of artifacts described as occurring along fossil Lake Mojave shorelines roughly equivalent in elevation to the outlet channel at the northern end of Silver Lake (Campbell and Campbell 1937:42). With respect to their previous finds at Pinto Basin (Campbell and Campbell 1935), the Campbells (1937:42) felt that the "paucity of pressure retouch on the Lake Mohave artifacts and the fact that they were more worn and sand-blasted than the Pinto Basin implements, imply an older culture on the former site." The presence of metates at Pinto Basin, and their absence at Lake Mojave was also considered indicative of the greater age of cultural remains at Lake Mojave (Campbell 1936:297). Antevs (1937:48) felt that Lake Mohave complex artifacts were "exclusively associated" with overflow levels and attributed this run-off, thus the artifacts, to a wet period during the late Pleistocene, ca. 15,000 B.P. Later Antevs (1952:26) revised the date in the light of his postulated tripartite Neothermal climatic sequence (Anathermal, Altithermal, Medithermal), suggesting an Anathermal-derived date of ca. 7,000 B.C. for the Lake Mojave artifacts. Artifacts were fashioned primarily by percussion, although pressure retouch occurred to a limited degree on thinner specimens such as points and crescentic stones (Barbieri 1937:101). Known best for its Lake Mohave and Silver Lake points (Amsden 1937:80-84), the complex also contained hammerstones, unifacial and bifacial tools, choppers, a variety of scraper forms, flake-knives, drills or perforators, crescentic stones, oval knives, and leaf-like blades (Amsden 1937:51-80). The cultural remains were interpreted as reflective of a hunting economy, with little, if any, seed-grinding and fishing (Amsden 1937:90-91). A hunting emphasis, as noted earlier, has yet to be substantiated by human-fauna stratigraphic associations at Lake Mojave. Thus, it is not surprising that Amsden (1937:92) rather cautiously added: "Fishing and seed-gathering are not wholly dependent on stone implements, however, so judgement must be withheld."

While there has been much questioning of the Campbell's and later interpretations of chronology at Lake Mojave (cf. Adams 1938; Rogers 1939; Roberts 1940, 1951; Strong 1941; Wormington 1949; Agogino 1961; Heizer 1965, 1970), there has been an equally considerable amount written in support of the complex's presumed antiquity. The supporters also have delineated a few critical errors of record made by those dissatisfied with chronological assessments (cf. Brainerd 1953; Warren and True 1961; Warren and DeCosta 1964; Woodward and Woodward 1966; Carter 1967; E. Davis 1967; Warren 1967, 1970; Ore and Warren 1971).

A brief review of relative and absolute dates assigned to the Lake Mohave complex reveals a strong correspondence with Bedwell's estimated range of 9,000-6,000 B.C. for the Western Pluvial Lakes Tradition, thus indicating that the El Paso/Red Mountain Planning Units were probably occupied to some extent during this period.

Antevs' (1952:26) estimate of ca. 7,000 B.C. has been accepted by Brainerd (1953:271), Warren and True (1961:271), and Bennyhoff (1958:Fig. 1). Wallace (1962:174) dated the complex at ca. 7,000-5,000 B.C. Warren and DeCosta (1964:206-208) associated radiocarbon assays for freshwater mussel shells (*Anadonata*) obtained from the 925-930 ft. level below beaches covered with Lake Mohave artifacts in the northwest corner of the basin. The dates are 7,690 B.C. ± 240 (LJ-200) and an unpublished date of 8,050 B.C. ± 300 given Hubbs by H. T. C. Smith (Hubbs, Bien, and Suess 1962:208-209). Heizer

(1965:127) questioned this association on the basis of the drawbacks to correlating environmental dates with archaeological remains, but E. Davis (1967:352) countered with a statement that "the association in this case has been investigated with such care that it must be kept in mind as highly probable." Woodward and Woodward (1966:102) suggested that man could have occupied Lake Mojave beaches anywhere from 11,500 to 4,500 B.C. Bettinger and Taylor (1974:13) suggested Lake Mohave and Silver Lake points date to at least 6,000 B.C. In general, dates for Lake Mohave and Silver Lake points correspond well with the sequence of projectile points in the Mojave Desert devised by F. Borden (1971) on the basis of relative degrees of artifact surface erosion. Indirect dates for the complex may be inferrable from Tadlock's (1966:668) identification of a Type III crescent from Lake Mojave (see Amsden 1937:76-78, Pl. 38a). This crescent form or Great Basin Transverse point (Clewlow 1968) is dated at ca. 7,000-5,000 B.C., and perhaps earlier (Tadlock 1966:672-673).

The "San Dieguito Complex" has been defined by Warren (1967), who groups within it a variety of presumably pluvial lake associated sites, localities, and complexes in the Desert West. These are as follows: C. W. Harris site (type site); Lake Mojave materials; Playa I-II, San Dieguito I-III (Rogers 1939, 1950, 1958, 1966; Warren and True 1961; Warren 1966; Hayden 1966); Owens Lake sites containing assemblages similar to those at Lake Mojave (Antevs 1952; Campbell 1949); Panamint Basin (E. Davis, personal communication to Warren 1967:77); and Tonopah sites containing Lake Mohave points (Campbell 1949). San Dieguito materials include "leaf-shaped knives of several varieties; small leaf-shaped points; stemmed and shouldered points generally termed 'Lake Mohave' and 'Silver Lake' points; ovoid, large domed and rectangular end and side scrapers; engraving tools; and crescents" (Warren 1967:177). Warren (1967:179) dated the complex on the basis of radiocarbon dates ranging from 1,950 B.C. ± 5,350 B.C. ± 200 for coastal sites featuring La Jollan complex materials, a component of which overlaid San Dieguito deposits at the type site (Warren and True 1961:260), and three radiocarbon determinations of the San Dieguito component at the type site, 6,540 B.C. ± 400 (A-724), 6,540 B.C. ± 400 (A-725), and 7,080 B.C. ± 350 (A-722A). Warren correlated the later dates with the various datings at Lake Mojave, and Antevs' (1952:28) suggestion that Lake Mohave artifacts at Owens Lake exceed 7,000 years in age. On the southern California coast, the San Dieguito Complex is dated ca. 7,000 B.C. (Warren and Crabtree n.d.). In general, Irwin-Williams (1968b:50) believed that San Dieguito artifacts predate at least a portion of the assemblage attributed to Lake Mohave (see also Treganza 1947).

E. Davis, Brott, and Weide (1969; see also E. Davis 1967, 1970, 1973) have postulated the "Western Lithic Co-Tradition" ca. 6,000-8,000 B.C. as a result of work in Panamint Valley. This co-tradition existed alongside the "Fluted Co-Tradition" and is comprised of artifacts common to the Lake Mohave and San Dieguito complexes. E. Davis' (1970:122) description of artifacts attributed to the "Panamint Variant of the Lake Mohave Pattern" included ovate bifaces, crescents, ovate and stemmed knife/points, large triangular borers, and scrapers and planes. However, Tuohy (1971:417-418) felt that the proposed co-tradition "apparently lacks solid supportive data," and "without data from Panamint

Valley one wonders if the author Davis would have conceived of 'The Western Lithic Co-Tradition' hypothesis at all."

Expressions of the Western Pluvial Lakes Tradition have yet to be adequately evaluated in terms of the economic patterns that produced the artifact distributions. To be sure, location of these assemblages along pluvial lakeshores, especially in light of Clewlow's (1968:47) suggestion that the widespread crescents described by Tadlock (1966) functioned as stunning points in the capture of waterfowl, putatively indicates that the lake environment was an elemental facet of early subsistence practices. The problem to be resolved, however, as is the case with fluted point distribution, is the degree to which the focus of lakeside subsistence was given to lacustrine exploitation, seed-gathering, hunting, or any combination of these. Advocates of a hunting emphasis, who presume that this focus stemmed from an even earlier hunting orientation utilizing, perhaps, fluted points, claim that the absence of artifacts attributable to lacustrine and/or seed-gathering activities offer negative evidence in support of a hunting tradition (cf. Amsden 1937; Rogers 1939; Wallace 1958; Hunt 1960; Warren and True 1961; Warren 1967; Warren and Ranere 1968; Tuohy 1968, 1970). Those suggesting alternative subsistence patterns point out that there is dismally little stratigraphic and associational evidence of a hunting emphasis, and that it is exceedingly difficult to establish that specific lithic implements were exclusively utilized in the processing of meat products (cf. Jennings and Norbeck 1955; Jennings *et al.* 1956; Jennings 1957, 1964; Rozaire 1963; Heizer 1964, 1966; W. Davis 1966; Clewlow 1968; Heizer and Baumhoff 1970; Hester 1973). With regard to this latter problem, a possibly significant endeavor would be to conduct edge-wear analyses of certain heretofore presumably ancient projectile points to establish whether they could have functioned equally as well as cutting or scraping tools. Once again, the need for further fieldwork, especially in the study area, cannot be over-stressed. More than likely, "as research progresses, we shall find that there are localized developments within the Western Pluvial Lakes Tradition" (Hester 1937:68).

In general, problems pertaining to manifestations of the Western Pluvial Lakes Tradition which could be attacked on the basis of research in the study area are much the same as those characterizing fluted points (i.e., artifact distributions, geological and archaeological associations, and, ultimately, cultural significance). A provocative idea advanced by Heizer (1970:71-72) may have relevance to archaeological investigation of pluvial shorelines such as those at Searles Basin. Heizer suggests that the presumably heightened deflation during the Altithermal (cf. H. Smith 1967) may have either uncovered shoreline cultural deposits subsequently covered with alluvium or, alternatively, aeolian deposits may have been laid down over artifacts at elevations above high lake stands attributed to the Anathermal. In either case, explorations of stratigraphy at points where "demonstrably ancient artifacts" are found would provide a good geological datum with which to associate artifacts (Heizer 1970:72). This would aid not only temporal consideration of the Western Pluvial Lakes Tradition, but may also further enhance understanding of the economic patterns identified with this tradition.

GREAT BASIN ARCHAIC

In his discussion of cultural chronology in the Great Basin, Hester considered the possibility of an occupational hiatus occurring in the southwestern Great Basin ca. 6,000-4,000 B.C. (1973:Fig. 25). This temporal span falls roughly between termination of the Western Pluvial Lakes Tradition (ca. 9,000-6,000 B.C.) and the appearance of assemblages attributed to a period which Hester (1973:125) termed the "Great Basin Archaic," ca. 4,000 B.C.-A.D. 250 (cf. Shutler 1961:69). A number of authors (among others, Wallace 1962:175; Kowta 1969; Hillebrand 1972b) have suggested that this gap in the archaeological record may be correlative with the concept of the Altithermal presented by Antevs (1948, 1952, 1953a, 1953b, 1955; cf. Willey 1966:353). Although there has been much debate over the validity of the Altithermal as Antevs conceived it, there seems to be a consensus that a period of hot and dry climate, distinctly more intense than today, did prevail in post-Pleistocene times. As Jennings (1968:60) writes, "that there was heat is not debated; its significance for man is at issue" (cf. Baumhoff and Heizer 1965:706).

Jennings (1966:86-87) noted the apparent gap between Lerma (ca. 8,000-6,000 B.C.) and Nogales (ca. 5,000-3,000 B.C.) complexes in Mexico (MacNeish 1958) and correlated this hiatus with similar observations made by others in the American West. However, Jennings (1968:87) suggested that the gap may be a function of site discovery and that "these apparent breaks in the sequence are of restricted and local significance and represent no significant period of regional abandonment." Bettinger and Taylor (1974:14) feel that there is no "archaeological or chronological evidence" substantiating an Altithermal-derived abandonment of southern California deserts (cf. Shutler 1967:305). In extreme southeastern California, although Rogers encountered no sites away from the Colorado River that he would date from 5,000 B.C.-A.D. 500, subsequent work has indicated that the area was not entirely unoccupied during this period (Weide and Barker 1974:81; cf. Treganza 1942:Fig. 11, 1 and 3; B. E. McCown 1955, 1957). Weide and Barker (1974:81) suggested:

> A final factor affecting the apparent sparsity of remains from this period is that collection of food such as mesquite requires little equipment that is not perishable. Collecting sites from the ceramic period yield little more than pottery. Since basketry served as the functional equivalent . . . remains of a collecting camp would be primarily fire cracked rock, and flakes, easily obscured and mixed unrecognized into materials from subsequent use of the sites in ceramic times.

It is probable that a climatic optimum of the sort Antevs delineated did occur in southern California deserts, and presumably had adverse effects on subsistence practices, but to infer an occupational hiatus may be more an accident of available dates than a truly complete removal of peoples from the region. The gap seen by many archaeologists correlates nicely with a "Terminal Paleo-Indian" phase in the Panamint Basin (E. Davis 1970:Table 11) and may correspond with what E. Davis (1968a:15) calls a "Transitional Stage" in eastern California, an ill-defined period following a "Paleo-Indian Stage" (i.e., Pre-Projectile Point Cultures, Fluted Point Tradition, Western Pluvial Lakes Tradition) and preceding an "Archaic" (i.e., Great Basin Archaic, Rose Spring-Eastgate Complex, Late Prehistoric) (cf. Brott 1969). As Altithermal conditions waned (Malde 1964b:126), archaeological evidence throughout the western Great Basin indicates that there was an abrupt increase in population, reflective of "more surface water and greater amounts of plant and animal food" (Baumhoff and Heizer 1965:705). If drought-like conditions ca. 5,000 B.C. did precipitate at least a partial abandonment of low-lying portions of the El Paso/Red Mountain Planning Units, it is conceivable that resources available at higher elevations, such as the uppermost slopes of the El Paso Mountains and, of course, the Tehachapi and southern Sierra Nevada Mountain to the west, would have been attractive localities for exploitation (cf. Grant, Baird, and Pringle 1968:112; Hillebrand 1972b).

The Great Basin Archaic as defined by Shutler (1961:69; 1968a:24) and adopted by Hester (1973:125-126) featured "exploitation of both desert and lacustrine resources, and certainly the utilization of other resources, such as those provided by mountain environments." As defined, the Great Basin Archaic combines and emphasizes the contemporaneity of subsistence patterns commonly attributed to the Desert Culture or Desert Archaic (Jennings 1953, 1957, 1964; Jennings and Norbeck 1955; Jennings *et al.* 1956) and lacustrine or lake margin accommodation (Heizer and Krieger 1956; Meighan 1959a; Rozaire 1963; Cowan 1967; Napton 1969; Heizer and Napton 1970). Several local designations for the period under discussion which may apply to the El Paso/Red Mountain Planning Units can be subsumed in the Great Basin Archaic, namely: Pinto-Gypsum and possibly Amargosa Phase I (Rogers 1939:47-64), Death Valley II (Wallace 1958:12-13; Hunt 1960:62-109), Period II (Pinto Basin) and possibly Period III-Phase I (Phase I Amargosa) (Wallace 1962:175-176), Little Lake, Early and Middle Rose Spring (Lanning 1963:281), Archaic Substage One or Early Milling, Archaic Transition (E. Davis 1968a:15, 1970:Table 11), and Little Lake and Newberry phases (Bettinger and Taylor 1974:Table 1).

Characteristic of Great Basin Archaic sites is the occurrence of Silver Lake, Humboldt, Pinto, Gypsum, or Elko series dart points (Hester 1973:126). As already noted, Silver Lake points were first recognized at Lake Mojave (Amsden 1937) and although generally considered as a component of assemblage attributed to the Western Pluvial Lakes Tradition, Silver Lake points appear to have survived later in time than Lake Mohave points (cf. Harrington 1957; E. Davis 1970; F. Borden 1971). Humboldt series points, as defined by Heizer and Clewlow (1968), feature three varieties: "Concave Base A," "Concave Base B," and "Basal-Notched."

Pinto points were originally defined by Campbell and Amsden (1934) (type site) and Amsden (1935). These forms were later re-evaluated by Harrington (1957) and Lanning (1963). On the basis of abundant Pinto deposits at the Stahl site near Little Lake, Harrington (1957:51-52) delineated five "subtypes" of Pinto points: "shoulderless," "sloping shoulders," "square shoulders," "barbed shoulders," and "one-shoulder." Lanning (1963:250-251) preferred to delete the term Pinto and insert the term Little Lake to identify "Pinto" points at the Stahl and Rose Spring (Iny-372) sites. Several authors have felt that "Pinto" has been rather loosely applied (cf. O'Connell 1971; Bettinger and Taylor

1974). For instance, Clewlow (1967:144) noted that Pinto "shoulderless" bear strong similarities to Humboldt Concave Base A and treats them as equivalent. Bettinger and Taylor (1974:13) felt that "this lumping of widely separated specimens within a single 'Pinto' type obscures what seems to be significant stylistic variation" and observed that the points from Pinto Basin are thick and percussion-flaked, whereas Little Lake "Pinto" points are long, thick, extensively pressure-flaked and exhibit deep basal notches. Furthermore, Bettinger and Taylor (1974:13) observed a striking similarity between points from Pinto Basin and the Lower Moist Midden at Ventana Cave (Haury 1950:284). They suggested that this similarity may imply a general confinement of Pinto Basin points to lower southeastern California (eastern Mojave and Colorado deserts) and western Arizona (see also True 1958). Meanwhile, Little Lake points have been found in the Mojave Desert, Death Valley, Panamint Valley, Owens Valley, and northwards.

Elko points were first defined by Heizer and Baumhoff (1961; see also O'Connell 1967; Heizer, Baumhoff, and Clewlow 1968) and include three varieties: "side-notched," "corner-notched," and "eared." It has been suggested that the Gypsum Cave point form (Harrington 1933) be referred to as Elko "contracting stem" (Clewlow 1967; Thomas 1970). Elko "eared" points closely resemble Little Lake forms, but the former features expanding stems in contrast to the straight stems of the latter.

Silver Lake points found within the planning units and their distribution in adjacent areas have been described in the previous section. "Pinto" points have been noted in the El Paso Mountains (Hillebrand 1972b:48; Apostolides, personal communication) and Elko and Gypsum Cave points from Black Canyon are described and illustrated in G. Smith's (1963) synthesis of San Bernardino County Museum records on sites within the Mojave River drainage system. Also, Simpson (1952b:141) reported "Pinto" points from Black Canyon. Possible Humboldt and Elko points were found at Harper Dry Lake (Hanks 1968:23). The authors also have reviewed photographs of Humboldt (Concave Base A, Concave Base B), Elko (Corner-Notched, Eared), and Gypsum Cave points collected by a local resident at Walker Pass and on the west side of Black Mountain (in the El Pasos).

"Pinto" and Gypsum Cave points have been reported in the southernmost Sierra Nevada and northern Tehachapi Mountains (Price 1954b; Elsasser 1960; Griffin 1963). "Pinto" and Elko points occur in the Coso Mountains at the northern end of China Basin (Grant, Baird, and Pringle 1968; Hillebrand 1972a). The Little Lake-Owens Valley area has produced Humboldt, Pinto-Little Lake, Elko, and Gypsum Cave points (Harrington 1948, 1952, 1953, 1957; H. Riddell and Riddell 1956; Redtfeldt 1962; Lanning 1963; E. Davis 1963, 1964; Walter 1970). Humboldt, Pinto-Little Lake, Elko, and Gypsum Cave points have been found in Panamint Valley (True, Sterud, and Davis 1967; E. Davis 1970). In the Panamint Mountains, possible Humboldt Concave Base A and Elko Eared points are described by Wallace and Taylor (1955a), and Humboldt, Pinto-Little Lake, Elko, and Gypsum Cave points have been found in Death Valley (Wallace and Taylor 1955b; Wallace 1958; Hunt 1960). Though not always referred to by the terms Humboldt, Pinto, Little Lake, Elko, or Gypsum Cave, such point types are not uncommon finds in the Mojave Desert (Campbell and Amsden 1934; Cambell and Campbell 1935; Campbell 1936; Campbell *et al.* 1937; Rogers 1939; Lawbaugh 1952; Peck and Smith 1957; G. Smith *et al.* 1957; Simpson 1958, 1960, 1965; J. Davis 1962; G. Smith 1963; Donnan 1964; True, Davis, and Sterud 1966).

In general, these point series follow a general temporal sequence, "roughly Humboldt-Pinto-Elko-Gypsum" (Hester 1973:126). Radiocarbon determinations for deposits containing Humboldt points generally fall between 3,500 B.C. and 1,100 B.C. (cf. Fowler 1968b; Roust and Clewlow 1968; Heizer, Baumhoff, and Clewlow 1968), and although Danger Cave dates suggest a much greater age, many argue that the Danger Cave data has been misinterpreted and that the deposits have been subjected to vertical mixing (cf. Lanning 1963:275; Warren and Ranere 1968:8; Hester 1973:126). A radiocarbon floruit of 3,300-1,200 B.C. applies to Pinto-Little Lake points in the Great Basin, and may date earlier (cf. Shutler, Shutler, and Griffith 1960; Heizer, Baumhoff, and Clewlow 1968; O'Connell and Ambro 1968; O'Connell 1971; Clewlow, Heizer, and Berger 1970; Hester and Heizer 1973; Bettinger and Taylor 1974). Although Elko points may date earlier in the eastern Great Basin (see Heizer, Baumhoff, and Clewlow 1968; Hester and Heizer 1973), a radiocarbon range of 1,200 B.C. to A.D. 200-600 is common for deposits containing these and Gypsum Cave points in the western and southwestern Great Basin (cf. F. Riddell 1960; O'Connell 1967, 1971; Roust and Clewlow 1968; Tuohy and Stein 1969; Clewlow, Heizer and Berger 1970; Heizer and Berger 1970; Hillebrand 1972a; Bettinger and Taylor 1974).

Aside from the distinctive projectile points characterizing the Great Basin Archaic, the period saw the appearance (or possible expansion) of stone implements utilized in the processing of plant foods (Jennings and Norbeck 1955:3; Jennings 1966:85; E. Davis 1968a:17). Early Great Basin Archaic sites contain milling stones in low proportion to chipped stone tools which dominate the assemblages (Susia 1964:30-31) and by 3,000-2,000 B.C. sites featuring artifacts (e.g., grinding tools) affiliated with a food-collecting subsistence pattern are known in the southwestern Great Basin (cf. Wallace 1962; Williams and Orlins 1963). Jennings (1965:85) described the Desert Archaic inventory as including:

> . . . basketry, netting, fur cloth, woven sandles, the spear thrower, hardwood dart points, stone tools preferrably of basalt and quartzite in the early stages (with a shift toward obsidian and other glassy materials later), flat milling stone, many specialized stone tools, scrapers, choppers, pulping planes of crude appearance, digging stick, curved wooden clubs, fire drill and hearth, tubular pipes, and imported shells from California for ornaments.

Great Basin Archaic materials in the southwestern Great Basin, usually comprised of lithic artifacts, are often located along presently anhydrous drainages, or near basins sometimes filled with shallow, ephemeral lakes (Harrington 1948:116; Wallace 1962:176; Susia 1964:31). Late Great Basin Archaic site locations and assemblages (e.g., Elko, Gypsum, or perhaps Amargosa Phase I points) are not well-defined in southern California deserts (cf. Wallace 1962:176), a "situation which stands in strong contrast to the northern Great Basin where materials from this period are well known, evidencing a well-developed hunting and collecting subsistence with specialized adaptations including use of lacustrine resources" (Weide and Barker 1974:82). Archaeological investigations in the El Paso/Red Mountain Planning Units might possibly improve the definition of Great Basin Archaic sites in southern California in the light of the many playas that are encompassed by the study area. Moreover, as indicated earlier, analysis of highland-lowland relationships during the early Great Basin Archaic may also be enhanced by research in the planning units.

ROSE SPRING-EASTGATE COMPLEX

This complex is set apart from the Great Basin Archaic by Hester (1973:34) on the premise that projectile points of the Rose Spring and Eastgate series represent the introduction of the bow and arrow into the Great Basin (cf. Lanning 1963:268). With the appearance of these points "larger dart point forms previously in use appear to have subsided in popularity, and in some instances, disappeared altogether" (Hester 1973:126). Defined by Lanning (1963), Rose Spring points come in three forms: "corner-notched" (most common), "side-notched," and "contracting stem." Eastgate "expanding stem" and "split-stem" points were first recognized by Heizer and Baumhoff (1961; see also Heizer and Clewlow 1968; O'Connell and Ambro 1968). Over the past few years, Rose Spring and Eastgate points, on the basis of their consistent association with each other, have become regarded as members of a single continuum with only minor morphological differences (Heizer and Baumhoff 1961:128; Hester and Heizer 1973:7). Hester's correlation of these point forms with the introduction of the bow corresponds well with Fenenga's (1953) analysis of chipped stone weights and functions. The idea here is that points become progressively lighter and smaller as the bow replaced the atlatl, an evolution noted often in the west and southwest Great Basin (among others, Meighan 1955:13; H. Riddell and Riddell 1956:30; F. Riddell 1958:46; Wallace and Taylor 1960:74; Elsasser 1960:29-30; J. Davis 1962:39; Clewlow 1967:145; Heizer and Clewlow 1968:67; E. Davis 1970:123; Bettinger and Taylor 1974:19). Heizer and Baumhoff (1961) and O'Connell (1971) have suggested that these two point series developed out of the larger Elko points in response to the need for smaller points when the bow was introduced (Hester 1973:34). This coincides with W. Davis' (1966:153) observation that the difficulty in separating arrows from darts (cf. Grosscup 1960:32-36) indicates: (1) that the dart served as the prototype of the arrow; and, (2) that the transition was a relatively easy one (cf. Jennings 1957:183).

Several local designations for assemblages that may come under the heading of Rose Springs-Eastgate Complex and which may apply to the study area are: later aspects of Amargosa Phase II (Rogers 1939:64-65), possibly Period III-Phase II (Phase II Amargosa) (Wallace 1962:176), late Death Valley II-Death Valley III (Wallace 1958:13-14; Hunt 1960:102-106, 111-163), Late Rose Spring (Lanning 1963:281), Non-Ceramic Yuman Horizon (Donnan 1964:11; cf. J. Davis 1962:47), Milling Archaic (E. Davis 1970:Table 11), and Haiwee (Bettinger and Taylor 1974:Table 1).

No published accounts of Rose Spring or Eastgate points exist for the study area, although the authors have seen photographs of Rose Spring Corner-Notched points supposedly found near Walker Pass by a resident of Inyokern. In adjacent areas, Rose Spring (predominant) and Eastgate points have been found in the Coso Mountains (Hillebrand 1972a), possibly in the southernmost Sierra Nevadas, and northern Tehachapi Mountains (Elsasser 1960; Guthrie 1957), in the Little Lake-Owens Valley area (Harrington 1952, 1953, 1957; H. Riddell 1951; H. Riddell and Riddell 1956; Redtfeldt 1962; Lanning 1963; Walter 1970), in Panamint Valley (True, Sterud, and Davis 1967; E. Davis 1970), possibly in the Panamint Mountains (Wallace and Taylor 1955a), in Death Valley (Wallace and Taylor 1955b, 1959; Wallace 1957, 1958; Wallace, Hunt, and Redwine 1959; Hunt 1960) and quite generally in the Mojave Desert (Rogers 1939; Peck and Smith 1957; J. Davis 1962; G. Smith 1963; Donnan 1964; McKinney, Hafner, and Gothold 1971).

Radiocarbon determinations from a wide variety of midden sites containing Rose Spring and Eastgate point forms show a floruit of A.D. 500-600 to A.D. 1,300 (cf. Clewlow 1967; Fowler 1968b; O'Connell and Ambro 1968; Heizer and Napton 1970; O'Connell 1971; Hester and Heizer 1973; Bettinger and Taylor 1974). As Hester (1973:34) noted, estimates for the introduction date of the bow range from 1,250 B.C. to A.D. 1 (cf. Grosscup 1957:380, 1960:32; W. A. Davis 1966:151; Grant, Baird, and Pringle 1968:51; Aikens 1970:200), yet Hester reasons that if it can be assumed that, for the most part, Elko points were attached to darts and Rose Spring and Eastgate points to arrows, then on the basis of radiocarbon assays the bow appeared ca. A.D. 500. This contradicts, however, Hester's (1973:Fig. 25) temporal positioning of the Rose Spring-Eastgate Complex in the southwestern Great Basin ca. A.D. 250-1,250. No explicit explanation is provided, but it is possible that Hester gave the complex an earlier initial date on the basis of Grant, Baird, and Pringle's (1968:51) suggestion that the bow appeared in the Coso Mountains ca. 200 B.C.

With respect to the economic patterns exhibited by the Rose Spring-Eastgate Complex, Hester (1973:126) stated: "There is no substantial evidence that the use of the bow and arrow brought about any significant economic changes." However, at Danger Cave a sudden 280% increase of ungulate bones between Levels IV and V (Jennings 1957:Table 21) indirectly suggests that there was at least some change in economic pattern after the bow showed up at the site. Moreover, a bow-caused decimation of Bighorn sheep populations in the Coso Mountains (at the opposite end of China Basin from the study area) has been hypothesized as a factor in an increase of Coso rock art ca. A.D. 1,000 (Grant, Baird, and Pringle 1968:112-115). The presumably adverse effects of the bow and arrow on game populations in the northern Mojave Desert may correlate with the lexicostatistical indications of a movement of peoples out of this area ca. A.D. 900-1,000 (cf. Lamb 1958; see discussion of Late Prehistoric). Hence, the archaeological record that might exist in the El Paso/Red Mountain Planning Units could provide processual information as to the bow's impact on economic factors. Future investigation of the effects of the bow on prehistoric populations in the southern California deserts would seem to dictate that close attention be paid to faunal assemblage reconstruction in the localities under study.

LATE PREHISTORIC

Hester (1973:127) defined the Late Prehistoric as "the introduction of brownware ceramics and Desert Side-Notched and Cottonwood series projectile points ca. A.D. 1,000 or somewhat later" which identifies "the advent of Paiute and Shoshonean peoples." In regards to the latter statement, it might be helpful to briefly review Lamb's (1958) lexicostatistic-derived explanation of Numic speaker dispersal in the western Great Basin, a postulate which has been accepted by most linguists (cf. Hopkins 1965; Miller 1966; Jacobsen 1966; Goss 1968). According to Lamb's hypothesis (1958:99), about 2,000 years ago Numic speakers (hailing from the Takic or Southern California Shoshoneans at a more remote time) separated into three mutually unintelligible, yet still "obviously related" (Spencer and Jennings 1965:274) familiar dialects: Northern Paiute, Shoshoni-Comanche, and Ute-Southern Paiute-Chemehuevi. Thereafter, ca. A.D. 950, these groups distributed themselves from southeastern California (in the vicinity of Death Valley) into the Great Basin. In the process of moving, the Kawaiisu, probable historic inhabitants of most of the study area, split off from the Ute-Chemehuevi (Lamb 1968:99-100). Two other glottochronological estimates of a Kawaiisu-Ute-Chemehuevi separation are A.D. 1,000 (Hale 1958:107) and A.D. 1,450 at the very latest (Goss 1966:272). Madsen (1975:82-85) has associated the dating of Paiute-Shoshoni pottery ca. A.D. 1,000 with the northward expansion of Numic speakers from the Southwestern Great Basin.

Desert Side-Notched points were originally defined by Baumhoff and Bryne (1959), who described four varieties: "General," "Sierra," "Redding," and "Delta." The Cottonwood series was first proposed by Lanning (1963) and included "triangular" and "leaf-shaped" forms. Heizer and Clewlow (1968) added a third variation, "bipointed." All three Cottonwood forms occur in late prehistoric and historic sites (see H. Riddell 1951) and are often in association with Desert Side-Notched points, which also are found in historic sites. Both Desert Side-Notched and Cottonwood points were products of an improving expansion of the bow and arrow complex. Radiocarbon determinations indicate that Desert Side-Notched points appeared ca. A.D. 1,100-1,200 and Cottonwood points ca. A.D. 1,300 (cf. Clewlow 1967; Fowler 1968b; Clewlow, Heizer, and Berger 1970; Elston and Davis 1972; Hester and Heizer 1973; Bettinger and Taylor 1974).

In the southwestern Great Basin, pottery is represented by two roughly contemporaneous traditions separated by a border that "lies somewhere between Joshua Tree National Monument and Death Valley" (Wallace 1962:177). The northern tradition is identified as Owens Valley Brown Ware (H. Riddell 1951:20-23) while to the south it is Tizon Brown Ware (Euler and Dobyns 1958) of the Palomar type (Meighan 1959b:36-39). The more rough-textured Owens Valley Brown Ware has been associated with Northern Paiutes and their neighbors (Steward 1933; E. Davis 1963) and is dated to A.D. 1,650 by H. Riddell (1951:20-23; see also Fowler 1968a:10). Tizon Brown pottery "exhibits close accordance to ceramic wares of the lower Colorado River Valley and upland northern Arizona" (Wallace 1962:177).

Late Prehistoric materials are found within the study area (Lawbaugh 1950; Harrington

1950; Heizer 1952; F. Curtis 1955; Pierson 1956; G. Smith 1963; Griffin 1963; Apostolides 1968; Hanks 1968), in the southernmost Sierra Nevada and northern Tehachapi Mountains (Heizer 1951; Price 1954a, 1954b; Guthrie 1957; Baumhoff and Bryne 1959; Elsasser 1960; Griffin 1963), in the Coso Mountains (Hillebrand 1972a), in the Little Lake-Owens Valley vicinity (H. Riddell 1951; Harrington 1952, 1953, 1957; H. Riddell and Riddell 1956; F. Riddell 1958; Redtfeldt 1962; Lanning 1963; Walter 1970), in Panamint Valley (True, Sterud, and Davis 1967; Davis 1970), in the Panamint Mountains (Lathrap and Meighan 1951; Meighan 1953; Wallace and Taylor 1955a), in Death Valley (Wallace and Taylor 1955b; Wallace 1957, 1958; Hunt 1960), and throughout the Mojave Desert (Campbell 1931; Rogers 1939; Babcock 1956; Peck and Smith 1957; G. Smith *et al.* 1957; Simpson 1958; Wallace and Desautels 1960; J. Davis 1962; G. Smith 1963; Donnan 1964; Wallace 1964; True, Davis, and Sterud 1966; McKinney, Hafner, and Gothold 1971; Bettinger and Taylor 1974).

Designations for Late Prehistoric remains in southern California deserts are many: Early, Late Desert Mohave (Rogers 1939:Pl. 18), Yuman I-III (Rogers 1945), Death Valley IV (Wallace 1958:14-15; Hunt 1960:163-284), Period IV (Shoshonean-Yuman) (Wallace 1962:177-178), possibly the Providence Complex (J. Davis 1962:45-46), Early, Late Cottonwood phases (Lanning 1963:281), Shoshonean Horizon (Donnan 1964:13), Pottery Archaic (E. Davis 1968a:15, 1970:Table 11), and Marana (Bettinger and Taylor 1974:Table 1).

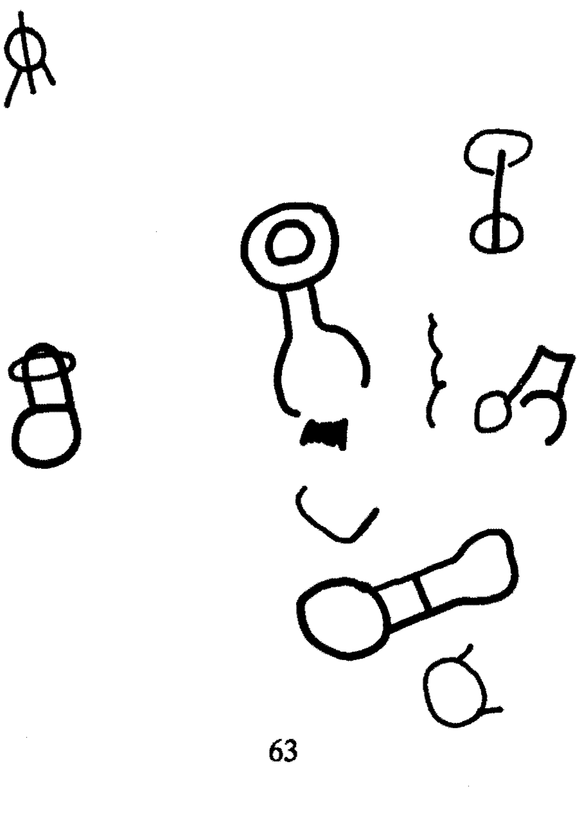
During the Late Prehistoric, a food-collecting lifeway persisted and, aside from sherds, artifacts associated with plant food processing (e.g., manos, metates, bedrock mortars, pestles) are the most common component of sites (Wallace 1962:178). Campsites attributable to this period are usually found in locations affording shelter from the wind, such as among sand dunes, around boulder clusters, and beneath rock overhangs (Wallace 1962:178). The sites usually are at a convenient distance from some water source, although historic sites far removed from water have been noted throughout the Great Basin (Heizer 1965:127; cf. Steward 1937:105).

There is little doubt that a wide variety of Late Prehistoric sites can be located within the El Paso/Red Mountain Planning Units, ranging from simple quarrying sites to occupational sites such as the shelter excavated by Apostolides (1968). Further archaeological investigation of the planning units, of course, would serve to enlarge the corpus of data on Late Prehistoric site distribution and composition, as well as increase knowledge of ecological adaptations developed in response to an arid habitat.

SUMMARY

From the few accounts of archaeological remains in the El Paso/Red Mountain Planning Units, and from the more substantive data available for adjacent areas, the following synopsis of occupational history in the two planning units is tentatively offered. It is likely that man was in this region of the northern Mojave Desert ca. 10,000 B.C., although his activities at this early date have yet to be clearly recognized or understood. Although there have been claims of so-called "pre-projectile point" cultures in the general vicinity of the study area, these postulations are far from general acceptance by the archaeological community and are in dire need of corroborative evidence from other areas in the American West. During the period from 10,000 B.C. to 6,000 B.C., cultural activities were probably characterized by a generalized subsistence pattern focusing at times on resources available along pluvial lake margins. Whether lacustrine or megafauna food sources were primary has yet to be delineated. It may be that neither source offered any selective advantage and thus both were simultaneously exploited. That the area was more watered and richly vegetated than at present seems to be indicated by paleoecologic information from Searles Lake (see Roosma 1958).

Between 6,000 to 4,000 B.C. the desiccating effects of a hypothesized post-Pleistocene climatic optimum may have been responsible for a partial abandonment of low-lying portions of the region for more attractive resources available at higher elevations, but the lack of data precludes any definitive statement on this period. By 4,000-3,000 B.C. a basic food-collecting lifeway seems to have been established that persisted into the historic period. This period featured the appearance of food-processing tools such as manos, metates, mortars, and pestles and in the early stages, Humboldt, Pinto, and Little Lake, and later on Elko and Gypsum series projectile points. The bow may have been introduced as early as 2,000 years ago as is indicated by the transition from larger and heavier dart points to the smaller and lighter point forms such as those of the Rose Spring and Eastgate series. The late prehistoric introduction of Desert Side-Notched and Cottonwood points represents an expanding development of bow and arrow technology, and are roughly associated with the appearance of ceramics and a recognizable trade system between the Great Basin and the Southwest and between the Great Basin and Central California.



POTENTIAL ARCHAEOLOGICAL SIGNIFICANCE OF THE EL PASO/RED MOUNTAIN PLANNING UNITS

The concern in this brief section is with some of the broader, anthropological implications of archaeological research in the El Paso/Red Mountain Planning Units. Specific regional research questions are considered in the concluding section that follows.

Assuming that the El Paso/Red Mountain Planning Units have witnessed cultural occupation and activity over a long period of time, there is a forseeable potential for the study of interaction between an evolving environment and the adaptive systems of hunting and gathering peoples. For example, extraction of economic rosources was a significant determinant of the land use patterns practiced by the aboriginal inhabitants of the California Desert (Weide 1973:6). Hence, possibly significant, and complementary, goals for archaeological research in the planning units would be clarification of past economic systems, and the explanation of the relationship between these systems and temporal shifts in the distribution of economic resources.

Examination of the environment's role in human activity is the study of "technoenvironmental transactions" (Harris 1971:657). Analysis of such transactions requires consideration of the interaction between technology and environment—a phenomenon common to all human ecological situations. Such transactions can be studied in terms of a dynamic equilibrium system operating between the cultural system and the coupled environing system (Clarke 1968:129). The technoevnironmental character of the preceding section on culture history is obvious and believed to be helpful. It must be emphasized, however, that determination of technoenvironmental transactions are not sole objectives of archaeological research. To explain culture (if such is conceivable) is to explain its processes, and to perceive these to the greatest accuracy involves, for one, an understanding of the processes of culture brought to the fore by adaptation to the physical environment. For instance, it is reasonably certain that subsistence-settlement patterns and technologies identified with early inhabitants of the El Paso/Red Mountain Planning Units differed to some degree from those characterizing more recent occupants of the region. Immediately one might attribute differences in the archaeological record to distinctly different ecological contexts. Yet delineation of contrasting culture-habitat articulations does not explicate or explain the processes involved in cultural responses to a transition from a better watered environment to a markedly arid one.

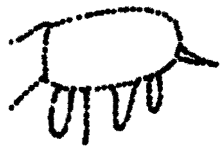
Archaeological research in the El Paso/Red Mountain Planning Units may be amenable to the application and evaluation of such broad dynamic equilibrium system models as carrying capacity (Zubrow 1971). According to Zubrow (1971:128), carrying capacity is the:

> . . . maximum number of organisms or amounts of biomass which can maintain itself indefinitely in an area, in other words, a homeostatic equilibrium point. It is homeostatic equilibrium in that there is a tendency toward the maintenance of a state of balance between opposite forces or processes which result in a diminishing net change or

a stable constant. It is dynamic in that the point at which the state of balance exists may change over time and space.

Such a model can be tied in with study of land use patterns, site composition, distribution, and density (such as in the El Paso Mountains and in the Black Canyon vicinity), and changes in the availability of economic resources. On the other hand, with the understanding that culture operates as a system (G. Weiss 1973:1384), modifications in exploitative techniques can affect carrying capacity equally as well as changes in economic resource status. For instance, the aforementioned hypothesis proposed by Grant, Baird, and Pringle (1968), which has significance for the understanding of prehistory in the El Paso/Red Mountain Planning Units, can be visualized in the perspective of a carrying capacity model. To reiterate, their hypothesis associates the introduction of the bow and arrow with a subsequent decimation of Bighorn sheep populations, an increase in rock art, and an eventual movement of groups out of the Coso Mountains (Grant, Baird, and Pringle 1968:112-115). In this case, the greater effectiveness of the bow over the atlatl gradually lowered the carrying capacity by reducing the availability of a certain economic resource, while the bow initially allowed an increase in the rate of population growth—ergo, the growth rate eventually overshot the "carrying capacity point" (Zubrow 1971:134), causing disequilibrium and bringing about a rise in the rate of out-migration (see Matras 1973). Although there are, of course, certain inherent difficulties in Grant, Baird, and Pringle's hypothesis, such as the lack of evidence with which to estimate pre-bow sheep populations or the lack of sites containing the faunal remains datable to the period following the appearance of the bow, the example serves to indicate the potential for model development and testing within the El Paso/Red Mountain Planning Units.

Models dealing with settlement patterns (e.g., Thomas 1971) and the concept of site catchment (Vita-Finzi and Higgs 1970) or "refuging" (Hamilton and Watt 1970), with expansive fieldwork and rigid statistical controls, could also be devised to cover and extract anthropological data from the differential patterning of archaeological sites (see base map) within the planning units. Furthermore, situated as they are in an area once bordered on the west and south by Californian cultures and on the east and southeast by the cultures of the greater American Southwest, the El Paso/Red Mountain Planning Units offer the potentially significant opportunity for the study of cultural interaction (e.g., Grant 1971; Ruby 1970). In this context, there are a whole variety of distribution and diffusion models which could be adopted, or modified, then applied (Clarke 1968:413-431).



SITE DISTRIBUTION, RESEARCH OPPORTUNITIES, AND SENSITIVE ARCHAEOLOGICAL AREAS IN THE EL PASO/RED MOUNTAIN PLANNING UNITS

Objectives in this final portion of the report are threefold. First, to roughly describe the distribution of known archaeological sites (specific locations are given on the accompanying base map). Second, in light of the information summarized in the preceding sections of the report and the distributional data, to briefly consider some possible and preliminary regional research questions that could be pursued by future archaeological endeavors within the El Paso/Red Mountain Planning Units. Third, to delineate particular areas of the planning units which show a sensitivity to archaeological site locations.

Any assessment of site distribution within the planning units demands the realization that the known pattern of site locations is more likely a function of discovery rather than of acutal site frequencies. There are clearly areas within the planning units which should not, necessarily, be interpreted as areas less attractive for prehistoric exploitation or occupation simply by reason of a comparatively lesser number of recorded sites. Without belaboring the point, these statements emphasize the general lack of systematic study of a large portion of the two planning units and, concomitantly, the enduring need for more fieldwork.

Nonetheless, aside from empirical drawbacks to formulating specific conclusions about site distribution, notable concentrations of recorded sites merit description. From a cursory examination of the records, it is obvious that the two most sensitive archaeological site localities are the El Paso Mountains (El Paso Planning Unit) and the general area in and around Black Canyon (Red Mountain Planning Unit). More specifically, in the El Paso Mountains, temporary camps, rockshelters, milling stations, and lithic scatters are common in the area northeast of Black Mountain and immediately northwest of Sheep Spring, while similar sites, rock alignments, and rock art sites are recorded for the Black Hills and for the west-central El Pasos in the vicinity of Bonanza Gulch and upper Last Chance Canyon. Alex Apostolides has informed the authors that there may be as many as 700 unrecorded sites in the El Paso Mountains, including a large number of petroglyph sites. Along the northwestern edge of the El Pasos, unofficial records suggest an impressive concentration of "rock rings" (Apostolides, personal communication; author's own notes). Apostolides has also indicated that there are many unreported petroglyph and occupation sites in the eastern El Paso Mountains. Temporary camps, rockshelters, a cemetery (?), and rock art sites are recorded for the southern edge of the El Pasos (i.e., Garlock Fault zone, northern Fremont Valley) in the vicinity of Mesquite Springs, the mouth of Iron Canyon, and just east of Goler Heights. Lithic scatters, temporary camps and, primarily, a huge number of rock art sites characterize the Black Canyon area.

In the El Paso Planning Unit, sporadic incidents of temporary camps, milling stations, a possible cremation, and rock art sites are recorded for the eastern slopes of the southernmost Sierra Nevada and northern Tehachapi Mountains: in Sand Canyon, Sage Canyon, below the mouth of Bird Spring Canyon (western Indian Wells Valley), around southern Kelso Valley, just south of Cross Mountain, and in Jawbone Canyon (at mouth and south of Blue Point). Rockshelters, lithic scatters, and rock art sites have also been recorded for areas at and around Desert Butte and Castle Butte.

In the Red Mountain Planning Unit, temporary camps and rock art sites are recorded for areas immediately east of Red Mountain, and in the northeastern Rand Mountains and southern Lava Mountains. Apostolides (personal communication) reports an extensive petroglyph concentration covering a quarter-mile of one ridge near Steam Wells in the Red Mountain vicinity. Rock art sites, temporary camps, and lithic scatters characterize areas north and northeast of Fremont Peak. Temporary camps, lithic scatters, and pottery loci have been found in eastern Searles Valley. To the north, unofficial information locates sites along the southwestern edge of Searles Lake (including The Pinnacles) and in Poison Canyon.

In the immediately preceding section, some broad potentialities for archaeological research in the El Paso/Red Mountain Planning Units were offered. The second objective in the current section attempts to break down these general opportunities into specific regional research questions. However, before presenting these, particular problems that exist in structuring culture history in the planning units should be noted for they also require further study.

Considering that the El Paso/Red Mountain Planning Units encompass or abut several pluvial basins (Koehn, Rogers, Cuddeback, Harper, Searles, China), one question of culture historical interest focuses on the definition, distribution, and dating (if possible) of early occupations in the planning units. If such finds were made under carefully and effectively implemented programs of site survey and surface collection, e.g., "exposed archaeology" (E. Davis 1975), a wealth of information might be generated that would lend itself to comparative analysis with other early complexes in the Desert West such as San Dieguito, Lake Mohave, and Hascomat (cf. Warren and Ranere 1968; Tuohy 1969). Particular problems that could be attacked with this data are the determination of economic patterns reflected by the archaeological remains and temporal and/or economic relationships between certain diagnostic artifact forms, e.g., fluted and concave-based lanceolate, and stemmed projectile points.

Likewise, the period ca. 6,000 B.C. to ca. 4,000 B.C. (see Fig. 7) needs a great deal of clarification in terms of diagnostic assemblages and their significance in the prehistory of the El Paso/Red Mountain Planning Units. More recently, certain problems of a culture historical hue are the dating of and diffusion of the bow and arrow, ceramics, and the definition and delineation of the factors surrounding the lexicostatistic implication of a dispersal of Numic speakers from the southwestern Great Basin ca. A.D. 1,000. Moreover, a specific research opportunity that should be pursued is the functional analysis of and dating of the rock ring concentrations in the northwestern El Paso Mountains. Despite the fact that such structures are common throughout the western and southwestern Great Basin, their purpose is still only vaguely understood. Some investigators prefer to consider them as cache pits (Cowan and Wallof 1974), while others consider them as supportive mechanisms for small brush shelters (Steward 1933).

Certain portions of the El Paso/Red Mountain Planning Units offer excellent opportunities for the archaeological appraisal of propositions, generated on the basis of ethnological data, dealing with cultural articulation between a number of systems, each of which encompasses both cultural and non-cultural phenomena. The assumption is that " . . . cultural change comes about through minor variations in one or more systems, which grow, displace or reinforce others and reach equilibrium on a different plane" (Flannery 1967:20). Moreover, " . . . it is hardly coincidental that the popularity of multivariate statistical tecnhiques in archaeology arose with the emergence of the 'new' or 'systemic' archaeology" (Thomas 1971:viii).

An area within the El Paso Planning Unit that could be studied in light of these ideas is that of Indian Wells Valley, bordered by the eastern slopes of the Sierra Nevada (Scodie Mountains) on the west, and on the east by the El Paso Mountains. According to the ethnographic data, the aboriginal seasonal round was keyed into the differential ripening of major plant food resources. Presumably, piñon nuts were collected during autumn for winter consumption while bunchgrasses, mesquite, and Joshua tree pods were gathered in the spring and summer. If such a pattern was actually the case, the archaeological remains should reflect the pattern. Much like Thomas' (1971) project in Reese River Valley, Nevada, a systematic program of site survey and surface collection in Indian Wells Valley could test the validity of the ethnographic model of subsistence-settlement patterns. Ideally the distribution, density, and composition of sites would reflect the land use patterns practiced by aboriginal inhabitants over the course of a year. For example, sites indicative of seasonal fall or winter occupation could be located in piñon zones on the eastern Sierra Nevada slopes or at the base of these same mountains. Meanwhile, the dispersal and temporary camps associated with subsistence-settlement patterns in the spring and summer could be found in Indian Wells Valley and on westward facing alluvial fans of the El Paso Mountains (the noted rock ring concentrations in the northwestern El Pasos may be significant in this regard).

Assuming such an investigation were undertaken, and the resultant data corresponded at least roughly with the ethnographic model, what would be the value of the information produced? One obvious contribution would be a general indication of the role played by certain archaeological sites in the El Paso/Red Mountain Planning Units with respect to aboriginal land use patterns. This, in turn, could be helpful in assessing patterns of site location and density for their significance to long term planning of use and development in the planning units. More conceptually, such an investigation could enhance understanding of the prehistoric relationship between economic resources and such things as population dynamics (e.g., K. Weiss 1973) or adaptive systems of hunting and gathering peoples inhabiting an arid environment. The conclusions derived from archaeological research could then be compared and contrasted with ethnographic data for contemporary hunters and gatherers occupying similar habitats (e.g., Berndt and Berndt 1964; Lee 1969, 1972).

Another research opportunity in the El Paso/Red Mountain Planning Units is the examination of the aboriginal network of trade relations as reflected in the archaeological record. The data presented earlier in the ethnographic section indicates that there was a system of trade between the planning units and Central California (trans-sierran), and between the planning units and the Southwest (e.g., the so-called Mohave trade route). The presence of two major passes across the Sierra Nevada and Tehachapi Mountains (Tehachapi, Walker passes) in the western part of the El Paso Planning Unit would seem to dictate that attention be given to cultural interaction between areas of fundamentally different ecological orientations (cf. Ruby 1970).

The high frequency of rock art sites in the El Paso/Red Mountain Planning Units offers several research opportunities. Initially, a considerable contribution would be a systematic examination of Black Canyon-Inscription Canyon petroglyphs, especially if study is oriented toward a comparative analysis with other notable rock art localities in the western and southwestern Great Basin (e.g., Baumhoff, Elsasser, and Heizer 1958; Heizer and Baumhoff 1962; Grant, Baird, and Pringle 1968). Such research may shed light on the symbolic role of rock art in aboriginal society, and generate insights into the relationship between subsistence techniques and rock art site locations (cf. Heizer and Baumhoff 1959). Throughout California, although prehistoric rock art has historically received limited attention from archaeologists, the study of such phenomena from an archaeological rather than an artistic perspective offers an ideal opportunity to broaden current understanding of California prehistory (Meighan, personal communication).

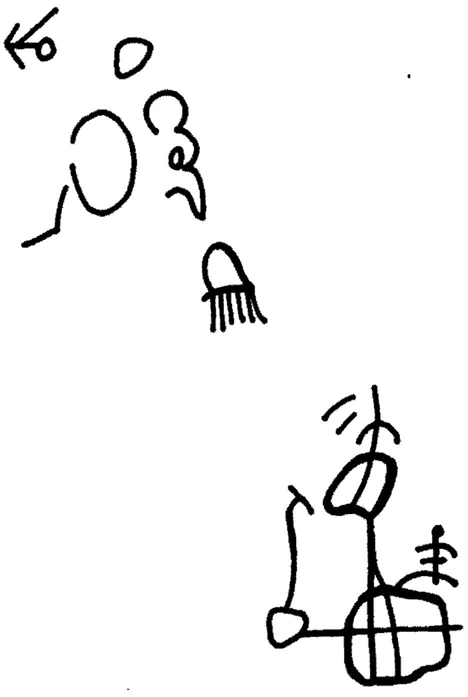
Finally, one problem that can be considered under the guise of both historical and processual approaches is the possible transition from an orientation toward lake-margin accommodation (Western Pluvial Lakes Tradition) to a lifeway identified by such food-processing tools as manos and metates (Great Basin Archaic) (see Fig. 7). It seems that this transition is co-terminous with a post-pluvial period of heightened aridity (Altithermal?). Specific questions would focus on the interaction between culture and an evolving environment, i.e., why and by what means were changes in economic patterns brought about in response to increasing aridity? There is a possibility that such a transition was tied in with a, as yet undefined, lowland-highland or highland-lowland relationship. If such was the case, the variable terrain (in terms of elevation) covered by the planning units offers an ideal context in which to develop and test hypotheses of a processual nature.

Given the distribution of recorded archaeological sites, and some possible future directions for research in the El Paso/Red Mountain Planning Units, several specific areas within the defined territories can be considered as valuable or "sensitive" archaeological localities.

Two areas whose site sensitivity has already been established are the El Paso Mountains and the area in and around Black Canyon. Although many of the recorded sites in the El Paso Mountains have been entered on the National Register of Historic Places, there is a distinct possibility of an even greater number of unrecorded sites in the El Paso Mountains.

Another area that can be considered archaeologically sensitive is the desert-facing slopes of the southernmost Sierra Nevada and northern Tehachapi Mountains. Ethnographic and ethnohistoric data, as well as the limited number of recorded sites, suggest that the numerous drainages coming off these slopes were often loci of aboriginal land-use. This is supported, furthermore, by the presence of two major passes in the area connecting the planning units with Central California.

Finally, although many of the pluvial shorelines with the El Paso/Red Mountain Planning Units are relatively unexplored, it is probable that these areas are site sensitive. The difficulty here, however, is estimating the amount of basin margin area that would offer the greatest likelihood of site location. A somewhat arbitrary area between a mile or so beyond the highest discernible shoreline and the edge of the playa floor may be appropriate.



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APPENDIX I

MAJOR PLANT COMMUNITIES

Proper Name	Common Name	Family
		(After Munz & Keck 1968)
I. NORTHERN JUNIPER WOODLAND		
Juniperus occidentalis	Sierra Juniper	Cupressaceae
Pinus jeffreyi	Jeffrey Pine	Pinaceae
Pinus monophylla	Single-leaf Piñon	Cupressaceae
Artemisia tridentata	Basin Sagebrush	Compositae
Penstemon speciosus	Penstemon	Scrophulariaceae
II. PIÑON-JUNIPER WOODLAND		(After Munz & Keck 1968)
Pinus monophylla	Single-leaf Piñon	Cupressaceae
Juniperus californica	California Juniper	Cupressaceae
Juniperus osteosperma	Utah Juniper	Cupressaceae
Quercus turbinella	Desert Scrub Oak	Fagaceae
Purshia spp.	Antelope Brush	Rosaceae
Cowania stansburiana	(Rose Family)	Rosaceae
Fallugia paradoxa	Apache Plume	Rosaceae
Cercocarpus ledifalius	Mountain Mahogany	Rosaceae
Yucca schidigera	Mojave Yucca	Agavaceae
Yucca baccata	None	Agavaceae
III. JOSHUA TREE WOODLAND		(After Ornduff 1974)
Yucca brevifolia	Spanish Bayonet	Agavadeae
Atriplex spp.	Saltbush	Chenopodiceae
Ephedra spp.	Mormon Tea	Ephedraceae
Eriogonum fasciculatum	Wild Buckwheat	Polygonaceae
Haplopappus spp.	Bristlewood	Compositae
Juniperus californica	California Juniper	Cupressaceae
Lycium spp.	Box Thorn	Solanaceae
Opuntia spp.	Cholla, Prickly Pear	Cactaceae
Salazaria mexicana	Bladder Sage	Labiatae
Tetradymia axillaris	Cotton Thorn	Compositae
Yucca schidigera	Mojave Yucca	Agavaceae
IV. VALLEY GRASSLAND		
Aristida (many species)	Three-Awn	Gramineae
Poa (many species)	Bunch Grass	Gramineae
Stipa (many species)	Needle Grass	Gramineae
V. SAGEBRUSH SCRUB		
Artemisia tridentata	Basin Sagebrush	Compositae
Atriplex spp.	Saltbush	Chenopodiaceae
Chrysothamnus nauseosus	Rabbit Brush	Compositae
Coleogyne ramosissima	Blackbush	Rosaceae
Purshia	Antelope Brush	Rosaceae
Tetradymia spp.	Cotton Thorn	Compositae

APPENDIX I (Cont.)

Proper Name	Common Name	Family
VI. SHADSCALE SCRUB		
Artemisia spinescens	Spiny Sagebrush	Compositae
Atriplex spp.	Saltbush, Shadscale	Chenopodiaceae
Coleogyne ramosissima	Blackbush	Rosaceae
Ephedra spp.	Mormon Tea	Ephedraceae
Eurotia lanata	Winter Fat	Compositae
VII. CREOSOTE BUSH SCRUB		
Encelia farinosa	Brittle Bush	Compositae
Fouquieria splendens	Ocotillo	Fourquieriaceae
Franseria dumosa	Burro Weed	Compositae
Hymenoclea salsola	Cheese Bush	Compositae
Larrea divaricata	Creosote Bush	Zygophyllaceae
Opuntia spp.	Cholla, Prickly Pear	Cactaceae
VIII. ALKALI SINK SCRUB		
Allenrolfea occidentalis	Iodine Bush	Chenopodiaceae
Atriplex spp.	Saltbush	Chenopodiaceae
Salicornia spp.	Pickleweed	Chenopodiaceae
Sarcobatus vermiculatus	Greasewood	Chenopodiaceae
Suadea spp.	Seep Weed	Chenopodiaceae

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AN ARCHAEOLOGICAL PROTECTION AND STABILIZATION PLAN FOR THE SQUAW SPRING WELL ARCHAEOLOGICAL DISTRICT NEAR RED MOUNTAIN, CALIFORNIA

by
Russell L. Kaldenberg and Jan Townsend

Bureau of Land Management
California Desert District
Riverside, California

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Russell L. Kaldenberg
Bureau of Land Management
and
Jan Townsend
Wirth and Associates

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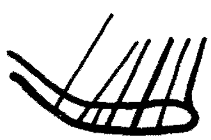
INTRODUCTION

The Squaw Spring Well Archaeological District, which encompasses nearly one square mile, is located along the eastern flanks of Red Mountain in northwestern San Bernardino County, California. Legally, the district is situated in Township 29 South, Range 41 East, Section 34, Mount Diablo Base Meridian, and is located on the Red Mountain and Klinker U.S.G.S. 7.5′ Quadrangles. Latitude and longitude coordinates incorporating the district are from 117 degrees 33′ 23" to 117 degrees 34′ 16" longitude and 35 degrees 21′ to 38" to 35 degrees 22′ to 35" north latitude.

A request for determination of National Register eligibility pursuant to Executive Order 11593 was made in 1976. On July 19, 1976, the Office of Archaeology and Historic Preservation of the National Park Service determined that the area "...is eligible for inclusion in the National Register." Additionally commenting that the district..." is significant because it forms one of the principal hubs for a larger network of subsistence and economic activities (and) further study of this area will likely yield important information on regional culture history, on processes of big game hunting and associated ritual, plant food processing (and gathering) and paleo-environmental reconstructions." The formal nomination was submitted to the Keeper of the National Register of Historic Places in 1981. Monies were allocated for protection of the district during the fiscal year 1978. In 1979 the large protective sign and the protective fence were emplaced to protect the resources at Squaw Spring. In 1981 the permaloy descriptive sign was placed within the district, completing the physical elements of the protection project.



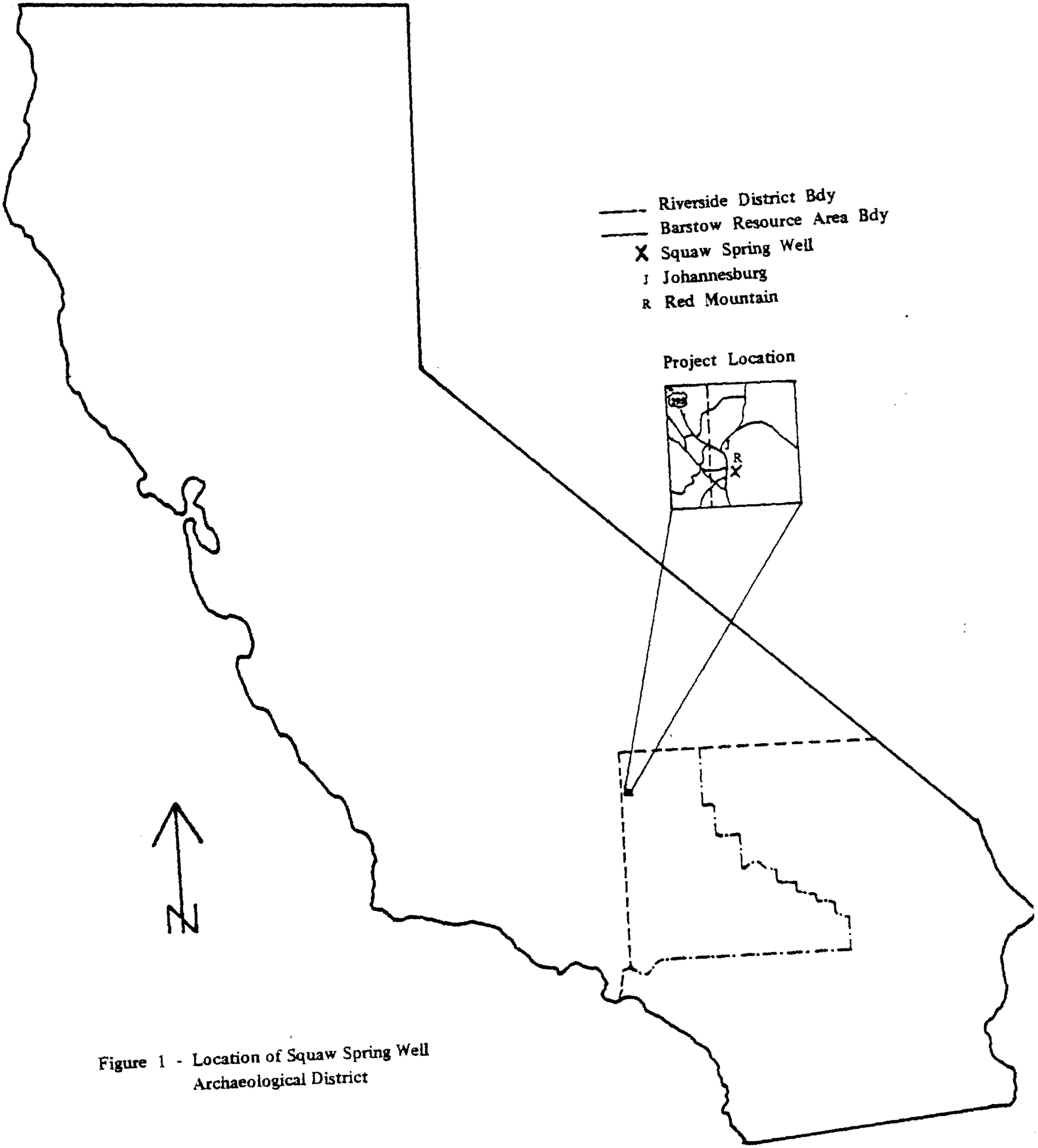
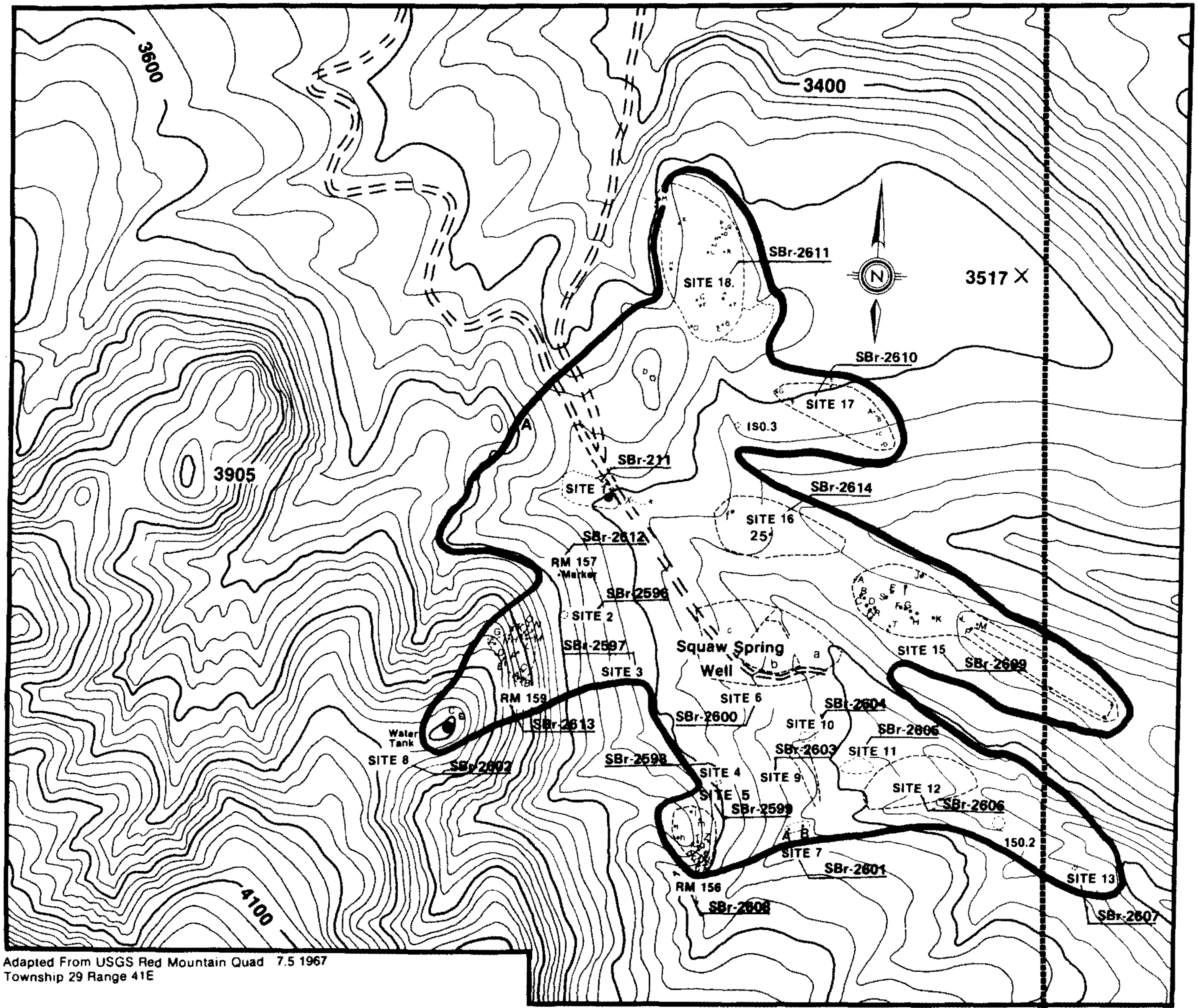


Figure 1 - Location of Squaw Spring Well Archaeological District

SQUAW SPRING ARCHAEOLOGICAL DISTRICT

1 inch = 200 feet.



Adapted From USGS Red Mountain Quad 7.5 1967
Township 29 Range 41E

Figure 2.

Known Archaeological Radiocarbon Dates from the Upper Mojave Desert

Sample No.	Site	Date B.P.	Calculated Date	Reference
Y-2406	Bench Mark Bay	10,270 ± 160	8480-8320 B.C.	Radiocarbon 1969: 53
QC-937	SBr 3427	7,350 ± 115	5515-5285 B.C.	Robert Reynolds (SBCM) Personal Communication
UCR-843	SBr 616	5,070 ± 120	3700-4190 B.C.	Rector, Swenson, Wilke 1979
UCR-3398	SBr 3801	3,190 ± 695	1925- 545 B.C.	Sutton 1980
UCR-3345	SBr 189	3,295 ± 80	1425-1265 B.C.	J. Leonard 1980
UCR-3344	SBr 189	3,210 ± 105	1365-1155 B.C.	J. Leonard 1980
UCR-3346	SBr 189	3,025 ± 75	1000-1150 B.C.	J. Leonard 1980
LJ-596	Newberry Cave	2,970 ± 250	1270-770 B.C.	Hubbs et. al. 1965:111
UCR-705	SBr 1455	1,160 ± 100	A.D. 690-890	R. Kaldenberg 1978
UCR-938	SBr 616	1,130 ± 100	A.D. 720-920	Rector, Swenson, Wilke 1979
UCR-942	SBr 616	1,095 ± 100	A.D. 900-1040	Rector, Swenson, Wilke 1979
UCR-941	SBr 616	1,050 ± 100	A.D. 800-1000	Rector, Swenson, Wilke 1979
UCR-939	SBr 616	850 ± 100	A.D. 1000-1200	Rector, Swenson, Wilke 1979
UCR-940	SBr 616	825 ± 100	A.D. 1025-1225	Rector, Swenson, Wilke 1979
UCR-937	SBr 616	775 ± 100	A.D. 1075-1275	Rector, Swenson Wilke 1979
UCR-770	SBr 260	570 ± 150	A.D. 1230-1530 E. Cronese	Drover 1979
UCR-767	SBr 259	560 ± 110	A.D. 1280-1500 E. Cronese	Drover 1979
UCR-763	SBr 2156	390 ± 140	A.D. 1420-1700 W. Cronese	Drover 1979
UCR-766	SBr 246	150 B.P. ±	1800 A.D. E. Cronese	Drover 1979
UCR-384	SBr 259	150 B.P. ±	1800 A.D. E. Cronese	Drover 1979
UCR-761	SBr 260B	150 B.P. ±	1800 A.D. E. Cronese	Drover 1979
UCR-383	SBr 259	150 B.P. ±	1800 A.D. E. Cronese	Drover 1979
UCR-764	SBr 2156	100 B.P. ±	1800 A.D. W. Cronese	Drover 1979
UCR-765	SBr 2159	100 B.P. ±	1850 A.D. W. Cronese	Drover 1979
UCR-768	SBr 128	100 B.P. ±	1850 A.D. E. Cronese	Drover 1979

Figure 3. From Kaldenberg, R.L. "The Archaeology of Selected Springs and Playas on Fort Irwin and in Portions of the Avawatz Mountains," San Bernardino County Museum Quarterly, Volume XXCIII, No. 3&4, page 11, Spring and Summer 1981.

ARCHAEOLOGICAL BACKGROUND

Within the district over forty archaeological sites have been identified as the result of work by Steward (1929), Ritter and Clough (USDI 1976) and Kaldenberg (1978). These sites range in type from large village sites of over 1000 square meters each with rock rings, rock art loci, lithic knapping station, deep midden, hunting blinds, milling stations and ceramic loci, to a water well and water storage tank which was used to supply the towns of Red Mountain and Johannesburg with water for several years in the early twentieth century.

Materials recovered or noted in the extensive midden include green slate pendants, exotic obsidian, red and brown ware pottery, thermally-fractured rock, and flaked and ground stone tools. Burnt faunal remains are also evident on the midden surface indicating a scientifically valuable source of data which would assist in the reconstruction of subsistence pattern reconstructions.

Numerous small petroglyph localities are scattered along the eastern flank of Red Mountain. These glyphs are generally located on vertical cliffs, however, several panels and isolated petroglyphs can be found on small boulders near other sites. They may have functioned as components of other activity especially related to sympathetic hunting magic or socio-religious interaction with nature.

The glyphs are primarily geometric in design, some of them are curvilinear, others represent zoomorphic elements, some abstract and at least one element appears to be anthropomorphic. The designs are related to the Great Basin Petroglyph style as discussed by Heizer and Clewlow (1973: 23-25).

All of the sites in the district can be related to the general culture history of the Red Mountain area (See Hall and Barker 1975) which is based upon current concepts of the prehistory of the western Mojave Desert. In this area four localities of a proposed Early Man stage of human history have been located (Hester 1973). These are the Manix Lake (Warren 1970), Coyote Gulch (Simpson 1961), Calico Hills (Simpson 1973), and China Lake (Davis and Meringher 1977). It is believed by some anthropologists that these site areas exhibit data which suggest that a human population existed in the Mojave Desert between 12,000 and 80,000 Years Ago (Y.A.). No such noncontroversial definitive evidence though, has been found. The earliest radiocarbon dated site in the Mojave Desert is attributed to a site near Baker, California and has been dated at 10,270+160 Y.A. (Ore and Warren 1971).

During the 4,000 year time frame, from 12,000 to 8,000 Y.A. groups of hunters and gatherers were centered around the pluvial lakes which filled much of the Great Basin. Paleo-ecological data from Searles Lake, north of Squaw Spring, suggest that the area afforded the aboriginal population with a great abundance of water and vegetation, although salinity levels were probably high. Lacustarine fauna and megafauna probably provided a food resource base for these early peoples.

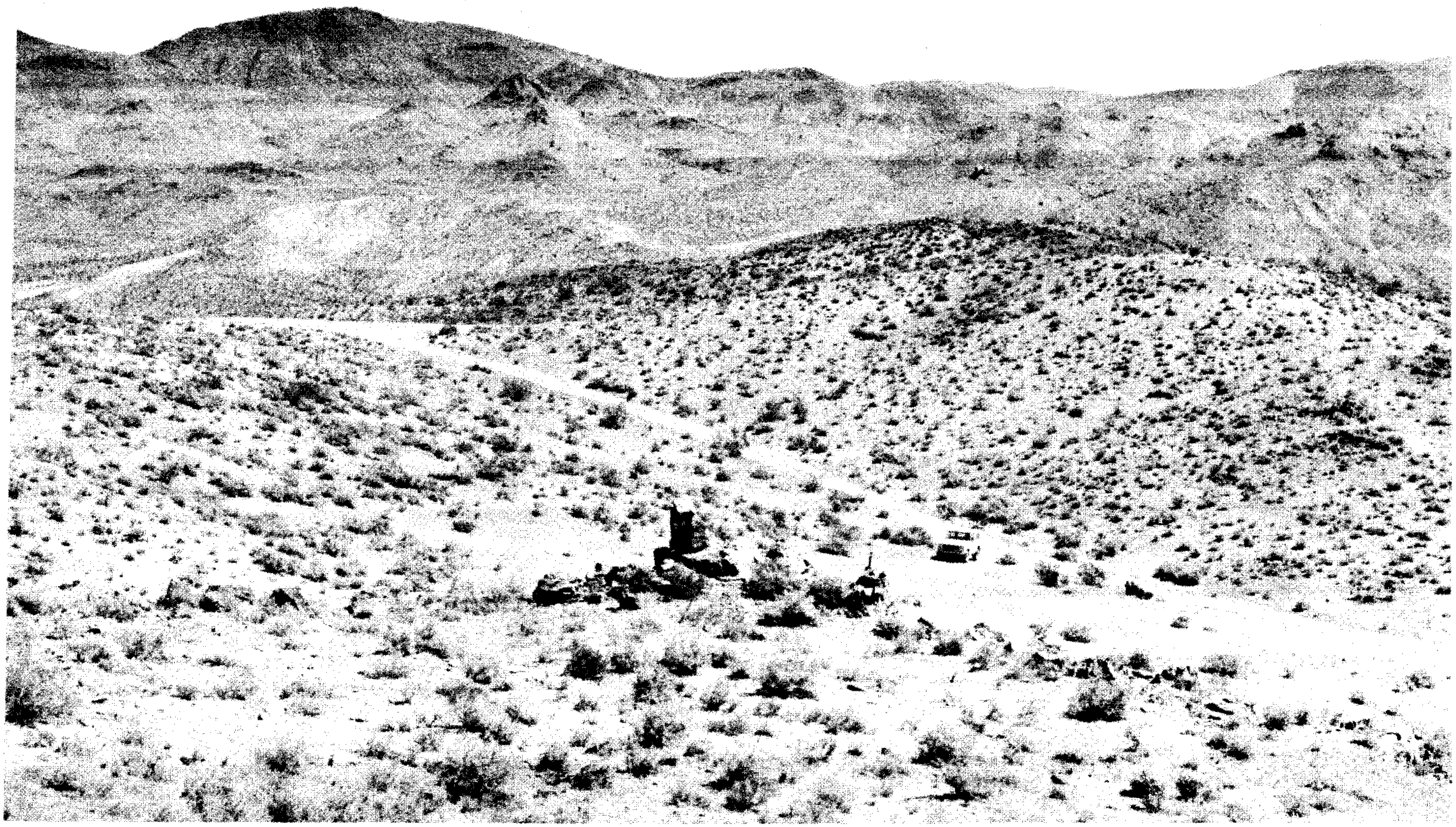


Photo 1. View looking towards SBr 211 and the Lava Mountains from Squaw Spring Tank.

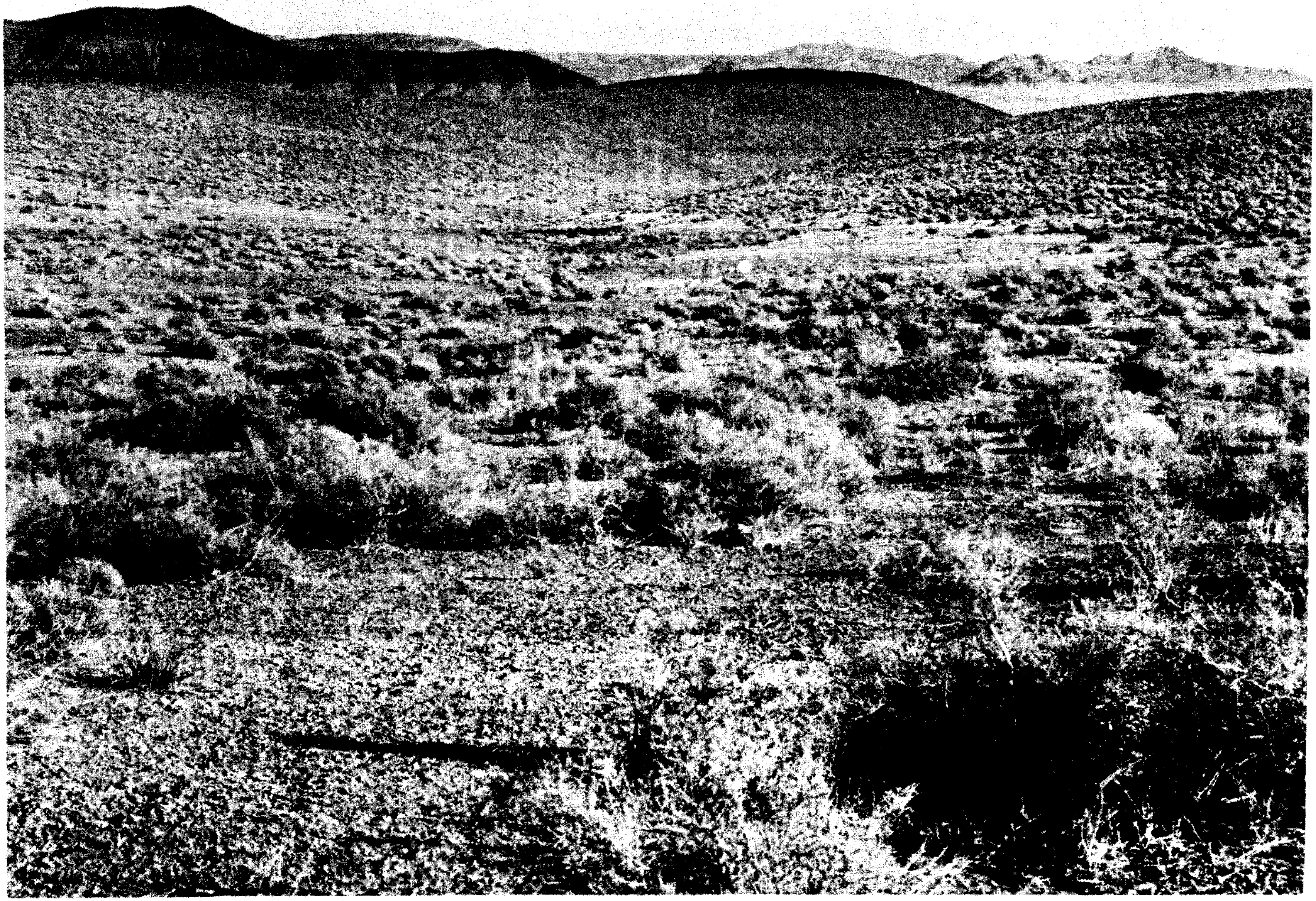


Photo 2. View of the Squaw Spring Archaeological District looking towards the Parachute Hills.

From 8000 to 6000 Y.A., less use was apparently made of the lower elevations of the desert than of the higher elevations. This may be attributed to a period of post-Pleistocene water desiccation. The coastal zones of California and Baja California were seeing large hunting-gathering-fishing populations for the first time (Roger 1938, Warren and True 1961, Warren, True and Eudey 1961, Moriarty 1966, Kaldenberg 1976).

By 6000 to 5000 Y.A. a basic food gathering system appeared which continued into historic times. Food processing tools such as manos, metates, mortars, and pestles were added to the basic hunting tool kit. The earlier sites are characterized by the Humboldt, Pinto, and Little Lake projectile point types, and the more recent sites by the Elko and Gypsum series of point (Ritter 1976).

The transition from larger, heavier projectile points to smaller and lighter types typical of the Rose Spring and Eastgate series may indicate the introduction of the bow into the area as early as 2000 Y.A. The expansion and development of bow and arrow technology is additionally supported by the late prehistoric introduction of the Desert Side-Notched and Cottonwood points found throughout the project vicinity. The appearance of ceramics and an established trade system between the Great Basin and the Southwest and Central California have been tenuously correlated with these two late prehistoric point types.

ETHNOGRAPHY

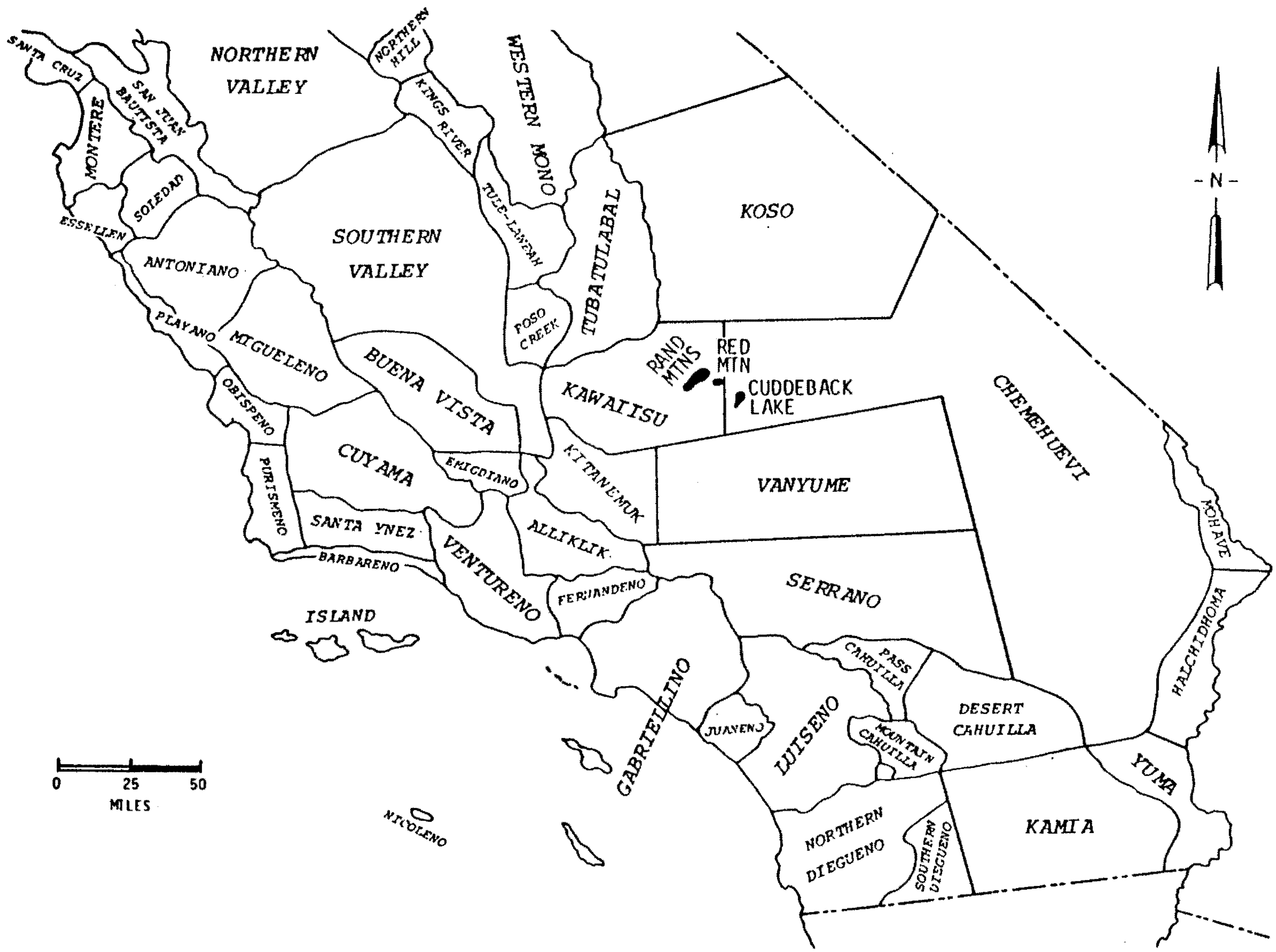
The area under consideration was occupied historically by the Koso and the Chemehuevi. Only the Koso appear to have used the area as a major resource base (See Hall and Barker 1975).

The Chemehuevi, while having territorial claims to the southern portion of the study area, were centered east between Twentynine Palms and the Colorado River.

Both groups pursued a generalized hunting and gathering subsistence pattern. Seasonal movements were in response to differential ripening of major plant resources while hunting appears to have been carried out as an adjunct to gathering. Major utilized plant resources within the area (prior to European introductions and modifications) included bunch grass, chia, and thistle sage seeds, Mormon tea, Joshua tree pods and stalks and mesquite beans. Mountain sheep, deer, rabbits, antelope, lizards and birds were among the animals hunted.

The following discussion centers on the Koso as they were possibly the primary group utilizing the area. Based on current vegetation and climate, the Koso probably were primarily using the area during the spring and summer months.

Photo 3. Structural rock ring at SBr 2609.



REGIONAL MAP SHOWING APPROXIMATE LOCATION
OF ETHNOGRAPHIC BOUNDARIES

Boundaries from Kroeber, 1925.

The winter months, from about mid-November to about the end of February, were the time of least food procurement activity in the seasonal round. Subsistence during this period was mainly dependent on stored foods, such as pine nuts and occasional supplements of fresh game. Villages were located on valley floors at the base of higher mountains in proximity to a permanent water source.

By the end of winter, stored supplies would have run low or become exhausted. At this time, from about the end of February to about May, winter camps would have begun breaking up and the people would have split into smaller population units to begin food procurement activities. The major resources exploited during this early spring period probably were Joshua tree pods and stalks (Yucca brevifolia), mesquite beans (Prosopis sp.), and other early spring seeds and tubers. Tule roots, if available, also would have been heavily exploited during this period.

During late spring and summer, from about May to the end of July, the population would have been at its lowest density because nuclear family groups would be widely dispersed to exploit bunchgrass, perhaps centralizing periodically at small villages. Very temporary shelters and very short-term camps would also have been characteristic of this period. Food procurement activity was localized on large alluvial fans, particularly in the area south and east of Red Mountain. Because of the replacement of bunchgrass by introduced grasses, archaeological evidence of these camps and summer activities can be expected in areas which do not now have a bunchgrass cover.

During late summer and autumn, from about August through mid-October, the native population would have begun leaving the grasslands to gather for the pinon harvest, the bulk of which would have taken place during September and October. The people would have made temporary camps and conducted periodic trips to winter camp locations to store nuts. Most major hunting activities, such as communal rabbit, deer, and antelope hunts, would have been carried out during this period. The annual calendar round would have ended by about the middle of November. The population was then at its greatest and most sedentary concentration. Activity again centered on equipment maintenance and manufacture in winter villages.

The Koso used bows and arrows for hunting. While no ceramics are reported in the ethnographic literature, there was extensive use of basketry. Basketry fragments and ceramic sherds have been located in the vicinity including numerous brown ware pottery at Squaw Spring. There was a range of milling tools in use, including wooden mortars. The use of obsidian for flaked stone tools is also reported; apparently imported from Inyo County locations.

The Koso were involved in trade through exchanges of local goods with the Yokuts to the northwest and groups in the Owens Valley. They also may have benefited from the extensive trade routes between the Southwest and the Pacific Coast (Hall and Barker 1975).

GEOLOGY

The Squaw Spring Archaeological district consists of the steep eastern flank of Red Mountain and associated small valleys, bajadas, ridges, and drainages. Geologically, Red Mountain andesite comprises the mother material, with Quaternary fill existing in the low lying areas of the district. The andesitic material is exposed on the flank of Red Mountain and in outcroppings throughout the district. It is considered to be Tertiary Rock (USDI 1976: 2-5) which is "...probably Pliocene in age" (Hulin 1925: 58).

These rocks provided fortuitous resources for the construction of aboriginal features and for use in the manufacture of stone tools, particularly milling implements.

VEGETATIVE COMMUNITY

The archaeological district is located in the Transitional Shrubland plant community which is a broad ecotone between Creosote Bush Scrub and Joshua Tree Woodland (USDI: 2-61). Vegetation within the Squaw Spring area includes creosote bush, bursage, Mormon tea, cheesebush, California buckwheat, boxthorn, hopsage, Mojave horsebrush, goldenbush, allscale saltbush and bladdersage. Large clumps of desert needlegrass are often found in rocky places. the north-facing slopes have relatively large amounts of Malpais bluegrass. Indian ricegrass and squirreltail grass are also found in the district. During the spring there is a spectacular display of ephemeral wildflowers. They were especially prevelant during the Spring of 1978 after a season of approximately 20 inches rainfall in the Red Mountain area.

FAUNAL COMMUNITY

The wildlife habitat type found within the archaeological district is the Transitional Scrubland (USDI: 2-22). This area has been determined to be raptor nesting and important foraging territory since it is consistently occupied by prairie falcons and other raptors, and there is a high density of raptor eyries on the mountain. The entire area has been identified by the California Department of Fish and Game as a productive area for chukar and Gambel's quail (Vernoy, personal communication).

A gallinaceous guzzler, Number A-91, is situated within the district. It is considered to be the most productive guzzler in over 100 square miles. This water catchment basin attracts numerous birds including chukar, Gambel's quail and the mourning dove. The California Department of Fish and Game has also indicated that deer and bighorn sheep are frequent users of the guzzler (McBride, personal communication). In 1978, burro spore was found within the district and a group of 5 burros was spotted near the New Freedom mercury mine approximately one mile north of the Squaw Spring guzzler. It is expected that coyotes, kit foxes, ringtail cats and bobcats also inhabit the vicinity.

Numerous game trails which meander up the eastern flank of Red Mountain can be seen from the benches of the eastern portion of the Squaw Spring Archaeological District. One of these trails bypasses a series of hunting blinds by approximately 100 feet.

OWNERSHIP AND LAND USE

The archaeological district is situated entirely on public lands. A small portion of Section 34 around Squaw Spring was set aside as a Public Water Reserve in 1911. Thompson (1929: 231) states that:

> The only other well known to be dug in bedrock is the Squaw Spring Well, on the northeast slope of Red Mountain in T. 29 S., R. 41 E. Mount Diablo Meridian. According to C. S. Knight, Manager of the Randsburg Water Co., this well is in the NW 1/4 sec. 27, and on the General Land Office township plat it is in the SE 1/4 Sec. 24. This well is one of several wells from which the Randsburg Water Co. obtains its supply. Originally Squaw Spring, in the bottom of a wash, is said to have had a small flow throughout the year. In order to avoid damage from cloudburst, the water company sunk a shaft at a point about 50 feet higher than the spring. This shaft is 7 by 9 feet in diameter and is 180 feet deep. In the bottom a drift is cut toward the spring. The shaft was dug all the way through a rock described as porphyritic "malpais," which is doubtless a Tertiary volcanic rock. When the well is not being pumped, the water stands about 50 feet below the surface, at about the same level as the old spring, which ceased to flow after the well was dug. The surface altitude at the well is about 3,400 feet. In 1917 the well was pumped with an Ames deep-well pump driven by a 15 horsepower Lambert gas engine. The supply is not great, for the well can be pumped only 4 1/2 hours daily, or 9 hours every other day. The yield when so pumped is about 4,800 gallons a day, or 18 gallons a minute. A reservoir cemented in solid rock, which has an estimated capacity of 100,000 gallons, is situated 535 feet higher than the well and about a quarter of a mile distant. No sample was taken of the water, but it is said to be soft and of good quality, slightly better than the water from the Mountain Well, which furnishes part of the supply for Randsburg.

That area is still classified as such and according to San Bernardino County records, the Randsburg Water Company still retains the water rights. The pumping equipment, however, has been dismantled and the well abandoned.

The entire area is open to location and entry under the 1872 Mining Law. Numerous mining claims have been filed in the area; 4"x4" posts dot the landscape every several hundred feet. Without a detailed mining record check and probably a field survey, it is impossible to determine who is the legal claimant or the exact location of each claim on the ground. A random check of several lode claims which were placed on each 4"x4" post indicates that a single individual has recently claimed most of the minerals. The claimant from Arizona indicated that the mineral is of a precious nature such as gold or silver.

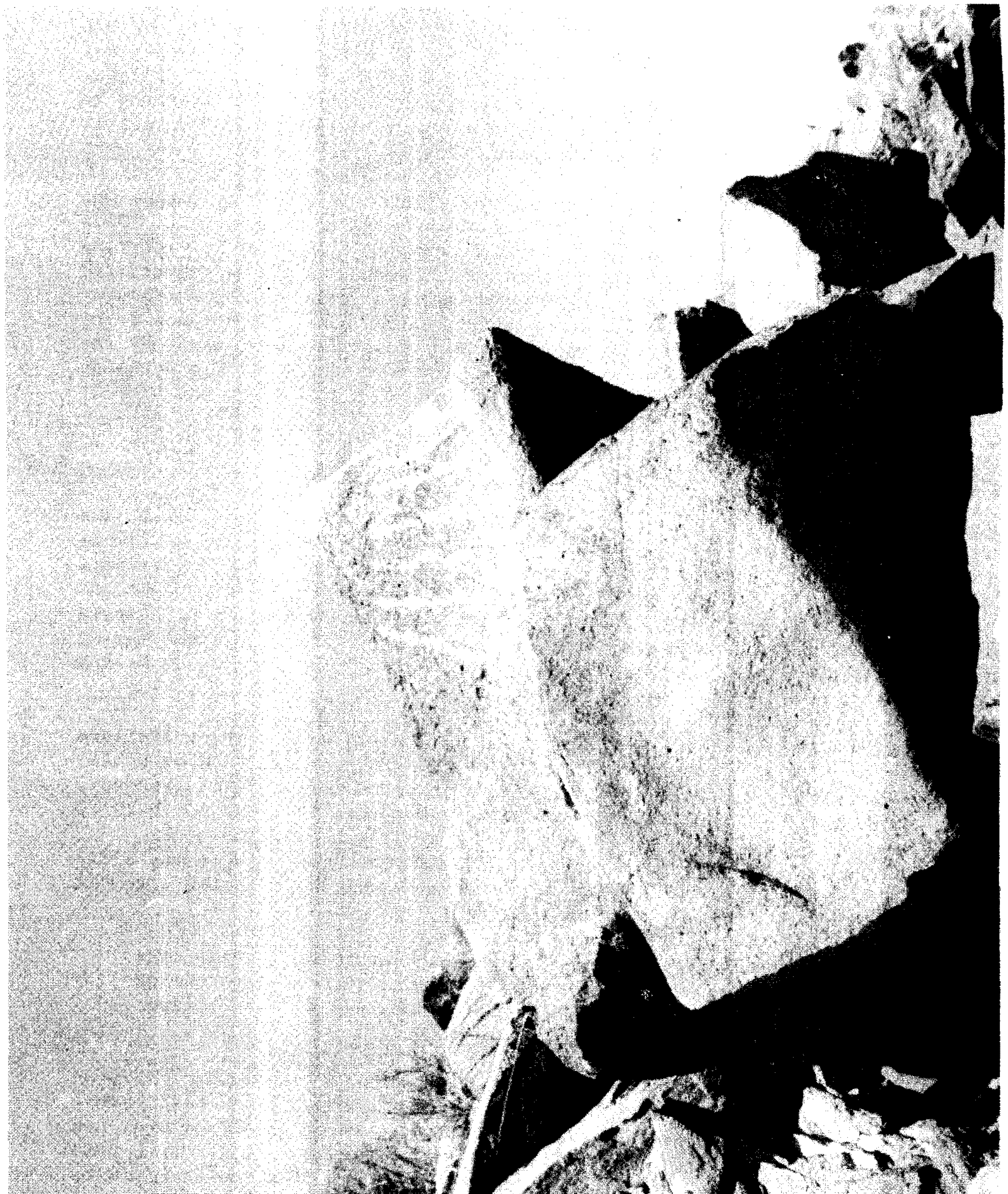


Photo 4. Petroglyph at SBr 2613, near Squaw Spring Guzzler.

The district is located within the boundaries of a known geothermal resource area (KGRA) which has been designated as a competitive lease area by the Bureau of Land Management. While Section 34, in which the archaeological district is situated is open for competitive leases, it has been excluded from surface drilling activity. Slant drilling from surrounding sections to depths of perhaps 2,000 feet below the surface of Section 34 is possible under BLM recommendations and restrictions.

Vehicular activity within the area is restricted to Existing Roads and Trails. That is, those roads and trails which were in existence in 1967. According to the Red Mountain Management Framework Plan, the Squaw Spring Archaeological District is also within the boundaries of a Competitive Events area. The Bureau of Land Management establishes the race course systems within the competitive area; however, these race courses avoid the cultural resources and are located well away from the core area of the archaeological district. No racing has been permitted within the archaeological district since 1976.

MANAGEMENT CHALLENGES

Squaw Spring is so designated on the U.S.G.S. topographic map. While the name's origin is lost in the abyss of historical frailities, it is likely that aboriginal artifacts, including petroglyphs, were noted by early miners in the area and the name Squaw Spring was attached as a reference to the archaeological remains. No information has surfaced which would indicate that the name was derived from a Native American living at Squaw Spring during early mining exploration in the area. By 1926 the name Squaw Spring appeared on U.S.G.S. maps (Hulin 1925).

According to several local residents of the Rand area, Squaw Spring has been exploited by artifact collectors for many years. Some collections were made by the San Bernardino County Museum numerous years ago and are presently housed at the museum in Redlands. These were examined by Townsend in 1977.

A popular rockhounder gem guide entitled "Desert Gem Trails" (Strong 1971) has led many collectors to the site area with a detailed map of the area and the following statement:

> "Squaw Spring has yielded many arrowheads, potsherds, and metates to collectors of Indian artifacts. The arrowheads and potsherds are found in the immediate vicinity of the old well. Status: Open to collecting."

In October 1977 the BLM Newsbeat published an article concerning the proposed protection plan at Squaw Spring. This quote appeared in that issue. Within a few days the Newsbeat editor was contacted by the publishers of the guide who stated that future editions of the publication will have this reference deleted. The 1978 edition had the reference deleted. However, the copies which are presently in distribution will continue to lead collectors to the site.

Since many of the midden-bearing sites can be driven to by persons using conventional vehicles, it is necessary to attempt to restrict access to vehicles because vehicles not only provide access for visitation, but are the means by which screens and shovels are transported to the site for clandestine, unlawful site disruption and artifact collection.

A very large area which was intensively excavated to a depth of over two feet has been nearly revegetated as the result of the heavy rainfall of Winter 1978. This disturbed area is now unnoticeable to all but the trained observer. Hopefully methods of access restrictions will prevent the reoccurrence of this type of recreational disruption.

RECOMMENDED ADMINISTRATIVE PROCEDURES

The following procedures have been studied and are recommended as primary steps to insure protection of the scientific resource:

1. Nominate the archaeological district to the National Register of Historic Places.

The archaeological district was determined to be eligible for inclusion in the National Register of Historic Places on October 27, 1976. The District has been formally nominated to the National Register and is now listed. Placing a site on the National Register confers some bureaucratic protective status in that the Advisory Council on Historic Preservation may address any proposed action which could affect the district in any adverse or beneficial manner.

Detailed procedures for completing National Register nominations are provided in the booklet _Procedures for Completing National Register Nominations_ (January 1977), published by the Advisory Council on Historic Preservation.

2. Prepare an Environmental Assessment Record on the Protection and Stabilization Plan.

Rather than compiling a complete environmental assessment record (EAR) for each protection measure proposed in this document, one blanket EAR should be completed. The EAR should be comprehensive enough to eventually address each protection measure. Supplemental EAR's can then be prepared by using the blanket EAR to address individual actions.

Much of the information which is required in an EAR is contained in the Red Mountain Unit Resource Analysis (Parts 2 and 3), the Red Mountain Management Framework Plan and the Randsburg, Sprangler Hills, So. Searles Lake Final Environmental Analysis Record. Input, though, is needed for vegetation, wildlife, and wilderness values. This will require several workhours of time from the various resource specialists.

3. Submit the Preservation Plan document to the Advisory Council in order to comply with 36 CFR 800.

Following the completion of the EAR, which may modify the protection procedures recommended in this report, the final preservation plan should be submitted to the Advisory Council for comment.

4. Withdraw the central area of the District from mineral location and entry.

Upon completion of the EAR and submission of the final preservation plan to the Advisory Council, work should begin on the withdrawal of the central area from mineral location and entry. This procedure will probably be the most difficult procedure to complete but, if accomplished, should confer a great amount of long term protection to the sites.

Presently, the entire area is open to minerals location and entry. Although the public water reserves located within the district was originally withdrawn from settlement, location, sale or entry (43 CFR 2300.3-0 and 43 CFR 2311), they are now subject to exploration, discovery, occupation and purchase under the mining laws (43 CFR 2300.0-3 (2)). Due to the legislative intent of the Mining Law of 1872 and subsequent interpretations of that law, the site area could be destroyed in the process of establishing a claim, mining it or doing the $100.00 a year improvement work required to keep a claim valid. This could all occur without necessary mitigation measures.

Since the area to be withdrawn is less than 5000 acres, the Secretary of the Interior on his own motion or upon request by the Director of the Bureau of Land Management may withdraw the area without the approval of Congress. See the Federal Land Policy and Management Act of 1976, Sec. 204 (d).

The information needed in order to justify a request of withdrawal is provided in Sec. 204, (c), (2) of the Federal Land Policy and Management Act of 1976 (FLPMA). See Appendix D for an itemized list and an example of a letter requesting withdrawal.

One aspect of the information required should be highlighted in this discussion. In order to request a withdrawal, a report must be prepared "...by a qualified mining engineer, engineering geologist, or geologist which shall include but not be limited to information on: general geology, known mineral deposits, past and present mineral production, mining claims, mineral leases, evaluation of future mineral potential, and present and potential market demands." Since this calls for detailed information, the geological and mining assessment should be initiated at the same time as the Squaw Spring Environmental Assessment Record. The geological and mining information can then be incorporated into both the EAR and withdrawal documents, although these documents will not require as detailed information as that provided in the validity determination document.

The information required to justify the withdrawal which is outlined in the 1976 Federal Land Management Policy Act (FLMPA), has to be provided to the (FLMPA) Director of the BLM via the State Office. More detailed information on the procedures one must follow that involve coordination between the District and State Offices, is outlined in Section 2350 (Withdrawal Procedures) of the BLM Manual. They include a) an evaluation of the proposed withdrawal by the Adjudication Officer in the State Office; b) publicizing the proposed withdrawal; c) holding a public hearing if deemed necessary, d) coordination with other agencies which may be concerned; and e) writing a staff report which includes sufficient information to allow an independent decision on whether or not the area should be withdrawn. General information on withdrawals and examples of format and of Withdrawal Request letters to the Director of the BLM are provided in the BLM Manual, Section 2300 - 2310.

A supplemental EAR which addresses the proposed withdrawal will have to be prepared. The necessary information should be available in the general EAR.

In order to process the withdrawal it will probably require close coordination between the archaeologist and realty specialist in the Area or District Office. Although procedures are outlined in the BLM Manual, the outline is not always explicit on which office (i.e. State or District) is to do particular portions of the withdrawal procedures. In addition, the information which is required for withdrawal is set forth in the 1976 FLPMA. However, the procedures outlined in the BLM Manual were written several years ago and may be subject to amendments.

Upon receipt of the withdrawal application, the Secretary of the Interior will publish a notice of withdrawal in the Federal Register within 30 days. This will serve to segregate the area from mining until a decision has been made regarding the withdrawal. Claims filed prior to the notice of withdrawal, however, are still considered to be valid until the validity of the claims are contested and determined to be invalid.

5. Determine the validity of existing mining claims.

In order to remove existing mining claims it would be necessary to determine the validity of the claims. Validity is determined by the "prudent man" rule. The rule states that a claim is valid where a mineral is found in such quantity as would warrant a prudent man in the expenditure of his labor and means in an effort to develop a paying mine (U.S. Dept. of Interior, Field Handbook for Mineral Examiners 1961).

The Field Handbook for Mineral Examiners (USDI 1961) and the BLM Manual Section 3920 outline the procedures that are necessary in order to determine the validity of a claim. The instructions are detailed and explicit. A minerals examiner must conduct a search of existing information sources (e.g. status, publications, etc.) and a field examination and prepare the evaluation report.

Following completion of the report and the evaluation, the persons who have claims in the area are served with a complaint setting forth the charges if the claim(s) are considered to be invalid. If the claimant does not respond within the appropriate time, the claims are considered to be null and void and the decision is filed by the BLM office. The claimant can appeal this decision. If the claimant does not respond, a hearing is held. On the basis of testimony at a formal hearing, the judge determines whether the charges that the claim(s) are invalid or true. The judge renders the decision. The claimant can appeal the decision.

6. Closure to Vehicle Entry.

Pursuant to Executive Order 11644, Section 9, the Squaw Spring Archaeological District was closed to vehicular access in January 1978. Previous to the closure, Squaw Spring was a part of the Randsburg/Johannesburg Designated Roads and Trails area. This designation allowed vehicle use on designated roads and trails. Squaw Spring was not protected from vehicular entry.

Also, in January 1978, visitation within the district was limited to 30 minutes. This was to protect the high wildlife values within the district associated with the on-site gallinaceous guzzler. Camping was prohibited.

RECOMMENDED PROTECTION PROCEDURES

The management measures recommended for the Squaw Spring Archaeological District are divided into two types: 1) physical (e.g. fencing, mapping, sampling, etc.) and 2) administrative (e.g. nomination to the National Register of Historic Places, validity assessment of existing mining claims and withdrawal of the area from mineral location and entry).

PHYSICAL PROTECTION MEASURES

1. Prepare a detailed and accurate map of all cultural resource locations within the Squaw Spring Archaeological District.

The map has already been prepared for the Squaw Spring Archaeological District (see page 3). All known features, each known petroglyph panel, boundaries of site loci and the location of three isolated artifact finds that were collected were mapped by Professional Surveyors Butch and Ginger Hancock of A.R.T. Maps of San Marcos, California. The linear distance, verticle angle and horizontal angle from established datum points were recorded using professional survey equipment. The exact location and boundaries were then plotted on a base map adapted from the Red Mountain 7.5′ topographic map. The base map was provided by BLM.

Prior to mapping the site, three archaeologists flagged and labeled all of the resources. The archaeologists also worked with the surveyors during the mapping. The surveyors had participated in numerous archaeological surveys and were familiar with the cultural resources. This contributed significantly to the efficiency and ease of mapping the site. The flagging and mapping together took three days.

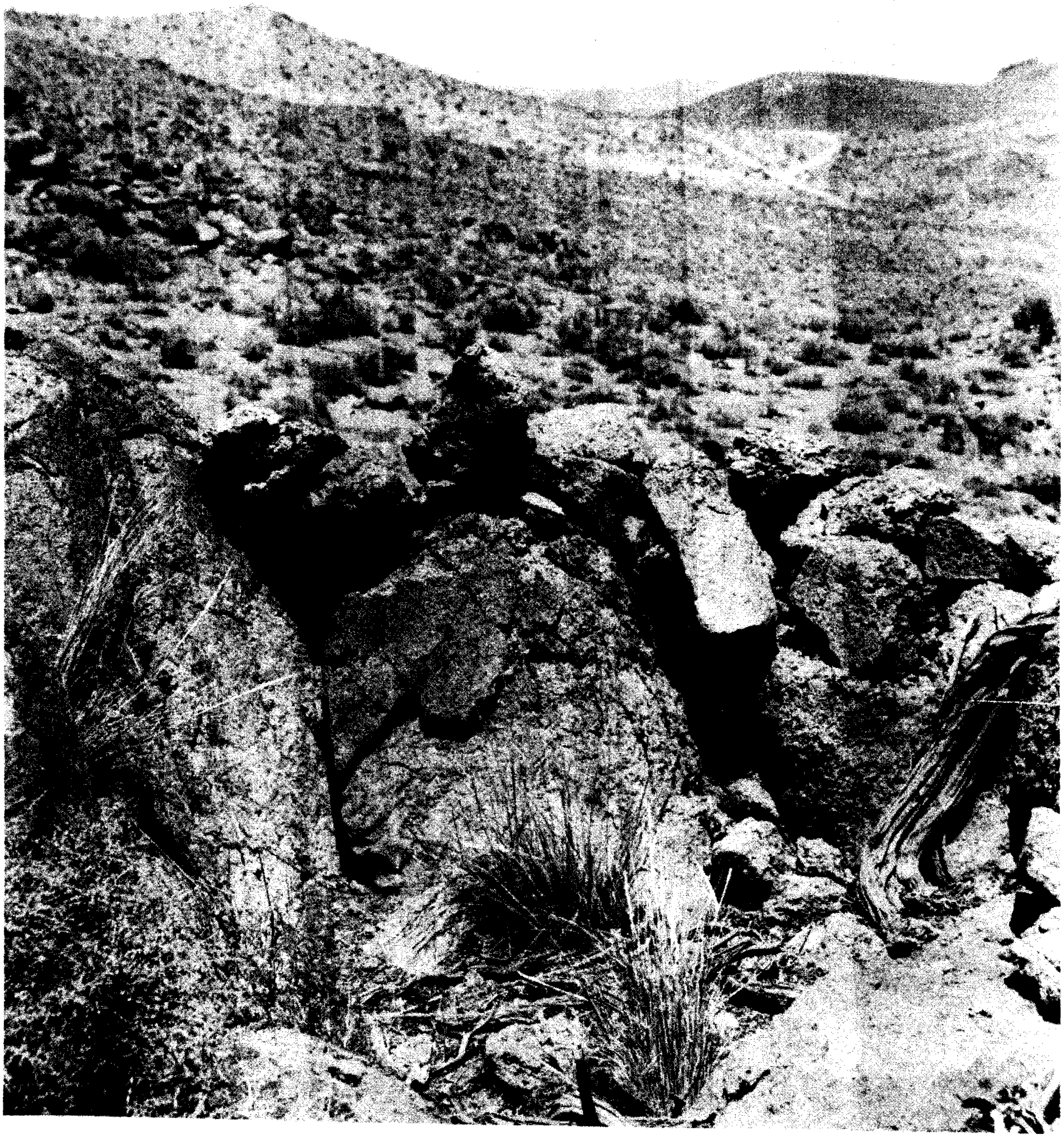


Photo 5. Exterior of hunting blind at SBr 2608, Squaw Spring.

Photo 6. Interior of hunting blind at Sbr 2608, Squaw Spring. All photos by Russell L. Kaldenberg, 1977.

The mapping was obtained through a purchase order. The Administration Division at the California Desert District Office prepared the necessary papers after the archaeologist obtained the bids from three survey companies. The bids ranged from $800 to $6,000. The lowest bid was accepted.

2. Limit vehicular access into the center of the site area.

A chain or anodized aluminum barrier should be placed across the road that leads into the site. The barrier should be placed approximately 1/8th mile north of Squaw Spring Well, at a location which would prohibit circuitous vehicle access. The chain should have a padlock that could be opened in order to allow access into the area by authorized persons. The California Department of Fish and Game maintain the guzzler and miners would be guaranteed the right of entry until the area is withdrawn from mineral entry.

The purpose of the chain is to stop vehicular access into the center of the site. This should help eliminate inadvertent disturbance of the cultural resources due to vehicular activity. Because individuals would have to carry equipment into the midden loci, closing the area to vehicular access should deter illegal excavation and the removal of cultural remains. For a line drawing of the chain barrier see Appendix I.

See Appendix E for details on the procedures for contracting for the construction of the chain barrier. The procedures to follow are the same as those for fencing. The barrier was put in place in 1979.

3. Place a field fence around the midden area located at the guzzler.

Because the guzzler is considered an attractive nuisance, the relocation of the guzzler was initially considered. After evaluating the potential impacts, a determination was made that greater impact would probably result if the guzzler were removed than if it remained at its present location.

Placing a layer of sterile soil or gravel over the midden area was also considered. In many cases, covering a site with fill may be a viable alternative, particularly where scenic-visual considerations are of importance. Factors such as differential erosion and impact to the existing vegetation makes fencing more practical and perhaps more effective in this instance.

A field fence should be constructed in order to restrict vehicular and pedestrian access. Because the fence would also be enclosing the guzzler, access has to be provided for wildlife using the water source. A gate is also necessary in order to allow for maintenance of the guzzler. See Appendix H for a line drawing of the proposed fence.

Final schematic drawings and cost estimates should be obtained from the Bureau's District Engineer. The construction of the fence should be contracted and fencing material should be included in the contract. For details on procedures see Appendix E and see Appendices F and G for details on types of fences and fencing meterial.

4. Four signs should be placed in the Squaw Springs Archaeological District.

a) One permanent sign that reads ROAD CLOSED AHEAD should be placed approximately one-half to one mile before the closure of the road. this is a regulatory sign and should be reflective in order to be readily visible (See R11-3 in Appendix K).

b) One permanent reflective sign should read ROAD CLOSED and be placed at the closure gate (See R11-2 in Appendix K).

c) A permanent routed wooden sign should be placed along the right side of the road near the ROAD CLOSED sign. It should have the name of the Archaeological District and an explanation of the closure (See Appendix L). Since this is not a standard sign, approval must be obtained on the design and the sign should be made at the BLM Sign Shop. For detailed procedures see Appendix J.

d) A permanent permaloy sign should be placed near Squaw Spring Well. The sign should address cultural resources in general. Appendix M shows a recommended sign design. This sign should be placed in the disturbed area around the remnants of the well.

5. Contract for a detailed study of the petroglyphs located in the Squaw Spring Archaeological District.

A contract should be let for the location, recordation, and analysis of all petroglyphs within Squaw Spring Archaeological District.

Recordation should consist of photographs and line drawings of all petroglyph elements. Isolated elements should be recorded individually. The elements that are closely associated spatially with other elements should be recorded both individually and within the context of their element group.

Most of the petroglyphs within the boundaries of Squaw Spring Archaeological District have been located and mapped with reference to established datum points. The exact locations of these petroglyphs would be supplied to the contracting party by the California Desert District Office of the Bureau of Land Management. It is reasonable to assume, however, that not all of the petroglyphs in this area have been found. The contract should, therefore, stipulate that a thorough visual survey of all rock outcroppings within this archaeological district be conducted for the purpose of locating additional petroglyphs.

If additional petroglyphs are found, they should be photographed and drawn in the same manner as the others, and their locations should be plotted on a 7.5′ topographic map of the area. A sketch map of each additional petroglyphs hould be drawn indicating its location with respect to major topographic features of the area.

Analysis of the petroglyphs should consist of a stylistic comparison of the elements found at Squaw Spring with those found in other parts of Southern California. The scope of this comparative evaluation should be limited to a literature search and be designed to provide a preliminary assessment of the cultural affinities of the prehistoric inhabitants of the Squaw Spring Archaeological District.

Heritage Research Associates of Holy City California was awarded a purchase order for $650 to complete line drawings of all petroglyphs.

6. Contract for a systematic augering in the core area of the Squaw Spring Archaeological District.

The Bureau of Land Management should contract with an institution or individual to do a sysematic post holing throughout the core area of the site. The purposes of the systematic subsurface testing would be to: a) determine the extent of the midden loci; b) obtain a sub-surface contour map of the site; c) obtain a preliminary sample of surface and sub-surface cultural remains; d) obtain information about the distribution of surface and sub-surface cultural remains; and e) assess the extent of the disturbance of the sites which has been caused by pothunters.

The information listed above should be synthesized in order to provide an assessment of the research potential of the area. In addition, the sampling will provide the data necessary to determine the need for a more comprehensive study (i.e. excavation). If excavation is decided upon in the future, the sampling results would aid in the establishment of the parameters of the contract.

POSTSCRIPT

Between 1978 and 1981 the entire plan to physically protect the sites within the Squaw Spring district was implemented. The fence was constructed by the use of the Young Adult Conservation Corps (YACC) under the direction of Jim Moses and with the field guidance of Mark Q. Sutton. Signs were emplaced both by Archaeologists and YACC personnel. The wooden sign remains without a wound as do the three Permaloy TM signs. Both directional signs have been continually vandalized and stolen. Numerous off-road vehicle groups, particularly the Association of Blazers of California have participated in desert awareness events and have been highly supportive of the road closure as has the California Division of Fish and Game. So far, the Squaw Spring Protection Plan is a success story.

The stabilization portion of the plan has yet to be funded; hopefully within the next decade excavations will occur which will allow archaeologists to chronologically place Squaw Spring within the proper cultural spectrum of desert prehistory. Current excavations being conducted by Garfinkle and McGuire in the El Paso Mountains should also assist in obtaining the important cultural chronology of the little known portion of the California Desert.

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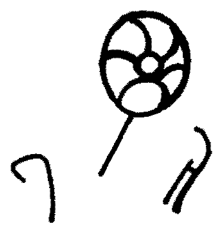


Appendix A

Archaeological Activity Plans:

Squaw Spring

Also, about this time a Management Framework Plan (MFP) was released on the Red Mountain Planning Unit. This included ideal statements such as "Protect the Squaw Spring Archaeological District," "Close it to ORV activities." "Withdraw the district from Mineral Entry." "Protect and enhance the areas cultural and wildlife values, and repatinate the vandalized desert varnishes." Just as this plan did not deal with how to repatinate vandalized desert varnishes, it also did not deal with mechanisms on how to carry out other protective measures.

Surficial evidence seem to indicate that these steps would be no real problem. An archaeologist would simply have to get with it and do it. Some guidelines must exist somewhere to do these things. Where were the guidelines? There were few if any, and none of them were compiled in a document for use by an archaeologist. They were all fragmented in various codes, regulations, and internal memoranda.

It became apparent that in order to protect the site some type of plan must be produced. But first, we needed to know more about the entity which we were going to protect. During the summer of 1977 Jan Townsend was hired as a 700 hour employee. Some of those hours were delegated to bein preparing an "Activity Plan" to protect the sites. The entire plan was a method designed to develop a system to allow the site to be efficiently protected and managed. One which allows the archaeologist and management to come to conclusions on how to effectively manage a single resource in a multi-resource agency.

Additional surveys were conducted, these located over 50 additional site loci. A map was produced at a 1-200 scale by professional surveyors with archaeological expertise, and research into methods of mineral withdrawal procedures. ORV closure, signing, and interim management was conducted.

The resultant study produced the following conclusions:

1. This area is designated as a prairie falcon and raptor habitat and is a prime area for chukar and Gambles quail.

2. A gallinacious guzzler (water catchment basin for wildlife) is also located within the district. The California Department of Fish and Game indicated that it was their only watering place for over 100 square miles, and the best one within a 500 square mile area. One of the game wardens indicated that deer and bighorn sheep utilize this water source in dry months. In other words, they expressed concern for the area.

3. The entire area is open to location and entry under the 1872 Mining Law. 4x4 locator posts dot the landscape every few hundred feet. A detailed mining record check and field survey for mineral content needed to be undertaken prior to any discussion withdrawal. Various codes of Federal regulation for this were explored and were presented with a documentation.

4. The district is situated within the boundaries of the Randsburg Known Geothermal Lease Area, but this one square mile section has been excluded from surface drilling activities.

5. Vehicular activity is restricted to Existing Roads and Trails, but Squaw Spring was within the boundaries of the legitimate Competitive Events Area. Events in this situation are limited to trails as they existed in 1967. It was contended that any event through the area would cause residual impacts to the resource.

6. A State Public Water Reserve is maintained at Squaw Spring for use in the Rand communities. It could be reactivated at any time the need was indicated by local communities.

7. Rockhounds frequent the area looking for artifacts and non-artifacts such as local chalcedonies and agates.

8. Hunters utilize the area for game birds in season and camp within its boundaries, creating modern rock rings and leaving 1970-style midden.

9. Campers frequented the area enough to be counted on several visitor use flights from an airplane.

As a result of the above findings several administrative procedures were suggested which the archaeologist has to do. These were:

1. Nominate the district to the National Register of Historic Places. (It had already been determined to be eligible);

2. Prepare an Environmental Assessment Record for processing the activity plan;

3. Submit the Activity Plan to the Advisory Council in order to comply with 36 CFR 800 Sec. 106;

4. Withdraw the area from mineral location and entry according to legitimate procedures as outlined previously;

5. Determine the validity of the existing mineral claims--this should be done under the prudent man rule. The rule states that a claim is valid where minerals are found in such quantity as would warrant a prudent man in the expenditure of his labor and means in an effort to develop a paying mine (U.S. Dept. of Interior, Field Handbook for Mineral Examiners 1961);

6. Close Squaw Spring to Off-Road Vehicular Activity (with the exception of legitimate entry by Cal Fish and Game, the BLM and those with a legitimate need to enter). These include miners with current, legitimate claims.

After the study, explicit action was recommended which would allow the archaeologist to:

1. Know the resources, flag and map them--this was completed by contract and with the help of BLM staff as the first step;

2. Limit vehicular access, (Use Executive Order 11644 as amended);

3. Blockade the road leading into the district;

4. Develop a signing procedure which adequately reflects the character of the district;

5. Withdraw from mineral entry, using the federal code, and,

6. Contract detailed studies of the petroglyph, conduct systematically controlled surface and subsurface studies of the area for its research and interpretive value and make a determination as to its subsurface value.

It should be apparent by now that archaeologists have never been trained to develop such bureaucratically-committed plans. Individuals emersed in a social scientific approach are not competent to undertake the jobs of mineral engineers, civil engineers, attorneys, and law clerks. Money, which was generated this year in an annual work plan effort to begin the protective process was given without such a plan, but with comments to protect Squaw Spring. A sum of $3,000--is generally too little to protect the site extensively, but too much to allow it to go back into the general treasury; so it must be spent within the allocated time period.

Now the task is to try to implement the withdrawal, fencing, gating, and signing. It seems simpler than it is. Because management, the decision-makers, must make the correct choices for the desert-users, the rockhound, ORV enthusiasts, protectors of wildlife, campers, botanists, miners, prospectors, and archaeologists. My direct line supervisor was presented with the solution of protecting the site from further damage by fencing and signing and road closure as the first step. It was management's decision and only my recommendation. The road into Squaw Spring had been in historic use for over 100 years. Water searchers, miners, rockhounds, campers, backpackers, bikers, explorers, and hunters all frequently used it. So how do you close a road of this nature?

An executive summary was issued which discussed (1) archaeology, (2) acute valdalism in the form of pothunting, (3) ORV damage, (4) economics of the activity plan, (5) research potential, (6) laws, regulations, and codes such as EO 11593, EO 11644 (as amended), Title 43, Subchapter F, Outdoor Recreation and Wildlife Management 6010.3, 6010.4, NEPA, and 36 CFR 800 were used, and (7) wildlife values presented to management. Management balked because the exclusion seemed to be primarily for the purpose of archaeology. The vehicular designation would have to be changed, and the road was frequently used by the various user groups. In a meeting with California Department of Fish and Game, Fish and Game supported the closure to protect wildlife values, but only if camping was prohibited within the closed area, and any visitation was limited to no more than a 30-minute period within the closed area.

Then in November 1977, a Desert Awareness Event was held in Red Mountain to expose the desert user to the desert's various ecosystems and resources. Squaw Spring was selected as the Archaeology and Cultural Resource Management Stop, and for the gallinaceous guzzler discussion. As a result, the persons exposed to the site gave their adamant support for the closure of the road. Their reasoning was that the road is a dead end that leads nowhere, the area is fragile and very sensitive, that discrete sites such as the rock rings go largely unnoticed when one is in a vehicle and could easily be destroyed even unintentionally, it is not necessary for access to the petroglyphs, they must be hiked to anyway, and it seemed to them that restricting access would reduce the number of sporadic individuals who brought screens and shovels into the site for the purpose of obtaining artifacts. The really important point of this whole exercise was that these people were basically ORV enthusiasts and not only did they agree with the closure, but they volunteered the labor to build the fence!

This sold our management.

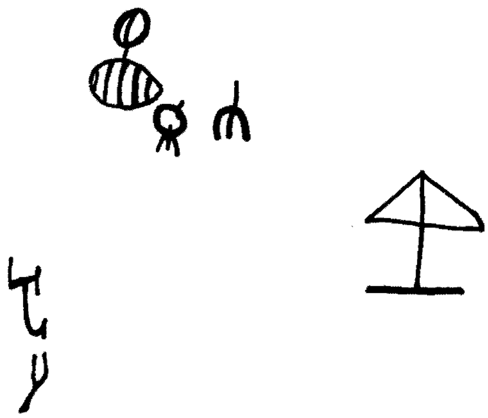
The closure of Squaw Spring was written by the archaeologist, signed by management, and published in the Federal Register in January 1978. The vehicle designation was charged from one of existing roads and trails was charged to a closed station which was consistent with EO 11644. Signs stating Road Closed were positioned within the roadway. Camping was also prohibited. A battle had been won. A job just begun.

The next step will be the construction of the barricade, with a gate and the approval of appropriate signing. Both steps still require some administrative policy interpretation but should be completed by October 1 of this year--a task which is now possible.

While this closure is a victory for the cultural resource program, the battle lines will surely be drawn when an attempt is made to withdraw the land from mineral entry, especially since gold and silver mining are again being undertaken in the area and atolia tungsten claims dot the region. It may be the multiple-resource managers, miners, and archaeologists lined up on three different sides. As much as I dislike the idea personally, it appears that in order to function most efficiently within an agency and to effectively manage cultural resources, archaeologists must move into non-archaeological management fields, because it is these people who hold the keys to the wisdom of how to do things fast and effectively. Unless we are able to share in that wisdom, we are subject to the whims of very effective multiple resource management, to the consternation and sometimes disadvantage of cultural resources.

As a postscript, Gem and Minerals will delete the reference to open status collecting at Squaw Springs by stamping across all remaining issues "No collecting, artifacts are protected by the Antiquities Act." The next revision of Desert Gem Trails will delete all references to the archaeology of Squaw Spring. While this seems to be a small step, it is a very significant step and shows that the magazine has some conscious and it will reach 30,000 or more desert users.

My document on the proper procedure for developing the plan, which codes to use, how to get the sign approved, etc., will be available about mid summer. While of limited use to non-Federal archaeologists it should contribute something to archaeological management and save many hours of the difficult time trying to find the proper codes and regulations.



Appendix B

National Register Nomination Forms

Form No. 10-306 (Rev. 10-74)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES INVENTORY -- NOMINATION FORM

FOR FEDERAL PROPERTIES

FOR NPS USE ONLY
RECEIVED
DATE ENTERED

SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES -- COMPLETE APPLICABLE SECTIONS

1 NAME

HISTORIC
Squaw Spring Archaeological District

AND/OR COMMON
Squaw Spring Archaeological District

2 LOCATION

STREET & NUMBER

X NOT FOR PUBLICATION

CITY, TOWN
Red Mountain X VICINITY OF

CONGRESSIONAL DISTRICT
37

STATE
California

CODE
06

COUNTY
San Bernardino

CODE
071

3 CLASSIFICATION

CATEGORY	OWNERSHIP	STATUS	PRESENT USE	
X DISTRICT	X PUBLIC	_OCCUPIED	_AGRICULTURE	_MUSEUM
_BUILDING(S)	_PRIVATE	X UNOCCUPIED	_COMMERCIAL	_PARK
_STRUCTURE	_BOTH	_WORK IN PROGRESS	_EDUCATIONAL	_PRIVATE RESIDENCE
_SITE	**PUBLIC ACQUISITION**	**ACCESSIBLE**	_ENTERTAINMENT	_RELIGIOUS
_OBJECT	_IN PROCESS	X YES: RESTRICTED	_GOVERNMENT	_SCIENTIFIC
	_BEING CONSIDERED	_YES: UNRESTRICTED	_INDUSTRIAL	_TRANSPORTATION
		_NO	_MILITARY	X OTHER: prospecting

4 AGENCY

REGIONAL HEADQUARTERS *(If applicable)*
United States Department of Interior, Bureau of Land Management

STREET & NUMBER
Riverside District Office, 1695 Spruce Street

CITY, TOWN
Riverside, CA 92507 — VICINITY OF

STATE

5 LOCATION OF LEGAL DESCRIPTION

COURTHOUSE, REGISTRY OF DEEDS, ETC.
County Clerk
San Bernardino County

STREET & NUMBER
351 N. Arrowhead Avenue

CITY, TOWN
San Bernardino, CA

STATE

6 REPRESENTATION IN EXISTING SURVEYS

TITLE
1929 report by Julian H. Steward (Univ. of California Publication in American Archaeology and Ethnology 24:2:47-238)
1975 Randsburg Geothermal Survey by Eric Ritter and Helen Clough
1977 Squaw Spring Activity Plan Survey by Russell Kaldenberg and Jan Townsend.

DATE
1929, 1975, 1977

X FEDERAL X STATE _COUNTY _LOCAL

DEPOSITORY FOR SURVEY RECORDS
BLM, 831 Barstow Road, Barstow, CA 92311
BLM, 1695 Spruce Street, Riverside, CA 92507

CITY, TOWN
San Bernardino County Museum (Society for California Archaeology Clearinghouse) 2024 Orange Tree Lane, Redlands, CA 92373

STATE

7 DESCRIPTION

CONDITION		CHECK ONE	CHECK ONE
__EXCELLENT	__DETERIORATED	__UNALTERED	X ORIGINAL SITE
X GOOD	__RUINS	X ALTERED	__MOVED DATE______
__FAIR	__UNEXPOSED		

DESCRIBE THE PRESENT AND ORIGINAL (IF KNOWN) PHYSICAL APPEARANCE

The proposed Squaw Spring Well Archaeological District comprises one hundred twenty-five (125) acres surrounding Squaw Spring Well, near Red Mountain, California. It contains twenty archaeological sites comprising twenty-three prehistoric loci and four historic loci. The prehistoric sites include a major village-midden, rock rings, cairns and alignments, milling stations, rockshelters, lithic scatters and several petroglyph locations. The central focus for this site complex is clearly the extensive village-midden. The deposit is over 1000 square meters in size and over one meter in depth; judgement of depth is based on erosion cuts and a trench and back-dirt pile left by pothunters in one locality. The environmental setting includes rugged dissected volcanic mountains abruptly in contact with old alluvial covered pediments transected by arroyos. Desert pavement is a common feature of these relatively flat surfaces. Vegetation in the area is transitional, with elements of the Creosote Bush Scrub and Joshua Tree Woodland present. Ecotonal or transitional communities offered prehistoric inhabitants a diversity of resources. The Squaw Spring Well apparently served as one of the major regional water sources and provided a focus for historic settlement. Historic loci include the foundation and apparatus of the well, cabin foundations, tailings and other material evidence of mining activities.

Materials recovered from or noted in the extensive midden include: burnt faunal remains, green slate pendants, red-ware pottery (possibly related to a southern Nevada type), thermally-fractured rock, flaked and ground stone tools and flaking debris of several lithologic types including obsidian, jaspar, chert, and chalcedony. Specific tools observed include projectile points, various knife and scraper forms, and manos and slab metates (over 15 of which were noted on the surface). Of the three projectile points observed in the area, only one, an obsidian point with concave base, may be attributed to a specific cultural period, probably Archaic. In this region of the Mojave desert, early (Paleolithic) sites are characterized by the Humboldt, Pinto and Little Lake projectile point types, Archaic sites by the Elko and Gypsum series of points, and more recent (Late Prehistoric) sites by the Cottonwood and Desert Side-Notched series. Other artifacts that may serve as temporal diagnostics are ground stone tools and ceramics. Food processing tools such as manos and metates were added to the basic hunting tool kit by 6000 to 5000 B.P. Precise determination has not been made for the introduction of ceramics in the Mojave region, though 1000 to 1500 B.P. is accepted by many investigators. Projectile points, ground stone tools and ceramics can serve to provide relative dates for the sites located in the proposed district, but without further investigation, including controlled excavation, collection of artifacts, and the application of specific dating methods such as radiocarbon and obsidian hydration analysis, no precise dates or cultural affiliations can be attributed to the resources.

Hunting was apparently undertaken in the adjoining lava escarpments and ridges as evidenced by several probable rock wall hunting blinds placed at appropriate locations for ambush. Numerous nearby petroglyphs are probably representative of the Great Basin Abstract Style, and may have functioned in sympathetic magic of the hunt.

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According to Grant (1971) the subject matter of this style is predominantly abstract: spirals, concentric circles, meandering lines, rayed circles, and crude zoomorphs and anthropomorphs; and they occur mainly on isolated boulders or cliff surfaces. The petroglyphs located in the proposed district meet both these criteria: glyph elements include circles, rayed circles, apparent zoomorphs, and a wide variety of abstract line designs; petroglyphs occur on boulders and large rock faces throughout the proposed district. This style is found throughout the Great Basin and is mainly the work of the Shoshonean-speaking people who dominated the Basin in prehistoric times. Heizer and Baumhof: (1962) postulated a hunting magic motivation for most of these Great Basin Abstract petroglyphs based on their location near known game trails and in narrow draws leading to water; several game trails noted around Squaw Spring Well provide evidence that the petroglyphs in the proposed district functioned as hunting magic. Petroglyphs can also serve as a time-marker. As the technological change from atlatl to bow and arrow occurred and the subsequent ability to more effectively hunt big-game, there is an apparent change in motif with the inclusion of glyph elements representing big horn sheep and other large game.

One of the sites near the main village locus contains several cleared circles, cairns and semi-circular rock rings about 5 meters in diameter. Grinding slicks, utilized flakes and chalcedony core-detritus are found in association with these features. Stacked stone windbreaks which surround at least two flat bedrock milling features form grinding blinds at the main site.

In other areas sites of the proposed district comprise milling slicks, small utilized shelters near probable hunting areas, scatters of fire-affected rock, circular structures and tool scatters.

The overall integrity of sites in this proposed district is high. Undoubtedly, surface collection has occurred on the major village but relatively little subsurface disruption is evident. Portions of sites may have been destroyed in the early 20th century by mining and well development activities but the extent cannot be determined. One rockshelter has been moderately vandalized.

Historic resources are another important aspect of the area. Old cabin foundations, mines, tailings, well development, pipes, trails and associated debris can be found throughout the proposed district.

The entire proposed district has been examined by a series of back and forth sweeps. Examination of the petroplyphs was undertaken by Steward during the 1920's, and recordation and minor collection from the midden has been completed by the San Bernardino County museum where such artifacts are curated.

Vehicular access to the district was restricted as of January 20, 1978. The proposed district has subsequently been fenced with access limited to a walk through gate. Interpretive and protective signs identifying the high significance of the proposed district were placed at the time of barrier construction.

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While absolute dates have not been established for the proposed district, evidence indicates that the sites were used by people inhabiting this region for several thousand years. It is known that a considerable amount of environmental change has occurred during this period and it is likely that the resources at Squaw Spring Well, particularly the midden deposit, might provide important data for understanding the relationship between environmental change and the influence it has on cultural and social behavior. Burnt faunal remains were observed in the midden. This material can provide not only evidence for establishing dates of occupation, but may also provide useful data about the nature of subsistence practiced by the peoples who inhabited this area. Similarly, palynological analysis should give insight into the nature of the environment during prehistoric times, thus enabling a more thorough reconstruction of past human lifeways.

There are twenty-three prehistoric loci located in the proposed district. While no precise determination of their relationships has been made, it is obvious that hunting was a major activity in this area--evidenced by the numerous petroglyph sites which are probably associated with magic of the hunt, and the several probable hunting blinds. Squaw Spring sites SS#'s 7, 10, 15, and RM-156, 157 and 159 each have petroglyphs as part of their site components, and SS#'s 2 and 4 are exclusively petroglyph locations. As part of the greater Siberian-North American tradition, these rock art sites are attributed to the work of shamen. Other sites, such as SS#'s 1, 3, 6, 9, 12, 15, 17, 18 and RM-156 and 161, are habitation loci ranging from complex sites with well established midden, where the day to day activities of the larger group would occur, to temporary camps, and other less complex sites probably used by task groups associated with the above mentioned hunting activities, as well as processing of vegetal food resources. Together, these loci represent occupation of an area that was suitable for maintaining the existence of a large group over a long period of time.

The historic remains represent mineral exploration which took place between 1880 and 1920. Gold, silver and steatite were claimed and mined within the district. The historic Squaw Spring Well is of great local significance since it was the major source of water for Atolia, Red Mountain and Johannesburg from 1914 to 1940. Portions of the structural foundation are still standing. All these materials can contribute to the understanding and knowledge of the rich mining/boom town era of the area.

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SQUAW SPRINGS SITE DESCRIPTION

Site Numbers	Site Type	Midden	Chronology		Integrity			Comments
			Hist.	Prehist.	Good	Fair	Poor	
SS#1 (4SBr 211)	Temporary Campsite	Present (30+ cms depth)		+		+		
SS#2 (4SBr 2596)	Petroglyph Element	None		+	+			
SS#3 (4SBr 2597)	Single Stone Enclosure	?		+	+			
SS#4 (4SBr 2598)	Petroglyph Panel	None	+		+			
SS#5 (4SBr 2599)	Historic Prospect Gouge	None	+		+			
SS#6 (4SBr 2600)	Water Well	20-100 cms	+	+		+		
a)	Modern pottery mixed with obsidian, flakes, and midden							
b)	Tin can dump, historic debris,some aboriginal materials							
c)	Rock ring with grinding slick, manos, tobacco tins, etc.							85 cms
SS#7 (4SBr 2601)	Petroglyph with milling	None		+	+			
a)	Petroglyph Panel	None		+	+			
b)	Two portable metates	None		+	+			
SS#8 (4SBr 2602)	100,000 Gal. Water Storage Tank	None	+ (1911)				+	

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Site Numbers (continued)	Site Type	Midden	Chronology		Integrity			Comments
			Hist.	Prehist.	Good	Fair	Poor	
SS#9 (4SBr 2603)	Temporary Campsite	20-100 cms		+		+		Some pothunting
SS#10 (4SBr 2604)	Petroglyph and Grinding Slick	None		+	+			
SS#11 (4SBr 2605)	Single Grinding Slick and Center Soldered Cans	None	+	+	+			
SS#12 (4SBr 2606)	Temporary Campsite	?		+	+			
SS#13 (4SBr 2607)	Chert Flake, Grinding Slick	None		+	+			
SS#14	See RM 156							
SS#15 (4SBr 2609)	Village Locus	50 cms		+	+			

a) Potsherds
b) Rock ring
c) Rock ring with flakes
d) Rock cairn
e) Petroglyph
f) Rock rings, obsidian, chalcedony, bone
g) Bedrock mortars and metates
h) Bedrock metates and manos in situ
i) One bedrock metate
j) One bedrock metate

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Site Numbers (continued)	Site Type	Midden	Chronology: Hist.	Chronology: Prehist.	Integrity: Good	Integrity: Fair	Integrity: Poor	Comments
k)	Rock rings, 3 manos							
l)	Rock rings, grinding slick, one mano							
m)	Grinding blind							
n)	Grinding slick							
o)	Grinding Slick							
p)	Rock ducks (mystical stone boundary markers to drive off spirits (e.g.) spirit break)							
q)	Rock ring							
r)	Rock ring							
s)	Cairn							
SS#16	Village	100 cms ±		+	+			Some pothunting - Sweat house present
SS#17 (4SBr 2610)	Village Locus	20 cms ±		+	+			
a)	Three boulders with mortars and slicks							
b-g)	Individual grinding slicks							
SS#18 (4SBr 2611)	Village	20 cms ±		+	+			
a)	Grinding slick							
b)	Rock ring							
c)	Lithic scatter							
d-j)	Grinding slick							
k)	Stone Enclosure							
l)	Grinding slick							
m)	Stone enclosure							
n)	Rock cairn							
o)	Rock cairn							
p)	Multiple slicks and rock enclosure							

Site Numbers (continued)	Site Type	Midden	Chronology: Hist.	Chronology: Prehist.	Integrity: Good	Integrity: Fair	Integrity: Poor	Comments
RM 156 (4SBr 2608)	Hunting blinds	Surface			+			With associated trail numerous plates, manos and some core tools. One metate for every blind. Scratched petroglyphs.
a-h)	Hunting blinds							
i-j	Petroglyphs							
x)	Hunting blind, grinding slick, petroglyph							
y-z)	Hunting blinds							
RM 157 (4SBr 2612)	Petroglyphs	Surface		+	+			20+ petroglyphs
RM 159 (4SBr 2613)	Petroglyphs	Surface		+	+			16 petroglyph panels

8 SIGNIFICANCE

PERIOD	AREAS OF SIGNIFICANCE -- CHECK AND JUSTIFY BELOW			
X PREHISTORIC	X ARCHEOLOGY-PREHISTORIC	_COMMUNITY PLANNING	_LANDSCAPE ARCHITECTURE	_RELIGION
_1400-1499	X ARCHEOLOGY-HISTORIC	_CONSERVATION	_LAW	_SCIENCE
_1500-1599	_AGRICULTURE	_ECONOMICS	_LITERATURE	_SCULPTURE
_1600-1699	_ARCHITECTURE	_EDUCATION	_MILITARY	_SOCIAL/HUMANITARIAN
_1700-1799	_ART	_ENGINEERING	_MUSIC	_THEATER
X 1800-1899	_COMMERCE	_EXPLORATION/SETTLEMENT	_PHILOSOPHY	_TRANSPORTATION
X 1900-	_COMMUNICATIONS	_INDUSTRY	_POLITICS/GOVERNMENT	_OTHER (SPECIFY)
		_INVENTION		

SPECIFIC DATES BUILDER/ARCHITECT

STATEMENT OF SIGNIFICANCE

This complex of diverse sites appears to hold a great deal of scientific and educational material. The complex represents an important facet of the prehistoric settlement pattern in the greater Red Mountain-Lava Mountain region. The relationship to a possible village site one mile north has not been established but deserves further investigation. Otherwise, only 2 major village complexes, this and Bedrock Springs (also submitted for eligibility determination), are known from an area of over 300 square miles. While several other complexes could be in the area, such complexes have been found only around springs and only two springs are known: Squaw Spring and Bedrock Springs.

Based on the regional study undertaken as part of a proposed geothermal project (see bibliography) this complex forms one of the principal hubs for a larger network of subsistence and economic activities. Sites within this district are probably related but further study is needed to substantiate interrelationships. Most likely, further scientific investigation would yield important information on regional culture history, big game hunting techniques and associated ritual, plant food gathering and processing, and paleo-environmental reconstructions. Further study of this site complex would help elucidate the preliminary model of adaptation developed in the above noted document. Briefly, this model postulates small groups of families (a band) inhabiting base camps like RM-161 and moving out in task groups to extract and process various resources. Water, as at Squaw Spring, formed the focus of their seasonal activities, probably during the spring and summer.

While this property has yielded significant information for understanding the regional settlement pattern and demography, and information helpful in inferring subsistence-economic pursuits and resource extracting and processing activities, there is the potential that further systematic investigations would aid greatly in solving problems of regional cultural history, culture change, causes of culture change, trade and social interaction, and serve as a general contribution to the region's cultural anthropology.

One of the principal research orientations for this district would be to establish the age and particular cultural affiliation for the subject resources. Based on tool types, ceramics and the apparent petroglyph style, the relative age of sites in the proposed district can tentatively be set between 6000 and 500 B.P. (Years Before Present). While the petroglyph motif evidences early occupation, artifact types, particularly ceramics, are indicative of later, probably Shoshonean, occupation; more specific affiliation cannot be determined without further investigation. Material for these purposes is abundant in the form of obsidian flakes and tools. Obsidian hydration research could provide chronometric control for the sites. Furthermore, the sourcing of this material, which would be necessary for the dating research, may also provide information that could be used for the study of trade networks and other forms of social interaction.

9 MAJOR BIBLIOGRAPHICAL REFERENCES

Kaldenberg, Russell L. 1978 Squaw Spring (Mojave Desert), California: A Case Study in the Exploration of Methods of Cultural Resource Protection in a Multiple-Land Use Agency. Paper presented to the Society for California Archaeology Annual Convention (available at SCA Clearinghouse, BLM).

10 GEOGRAPHICAL DATA

ACREAGE OF NOMINATED PROPERTY 125

UTM REFERENCES

	ZONE	EASTING	NORTHING		ZONE	EASTING	NORTHING
A	1 1	4 4 8 6 5 0	3 9 1 4 3 2 0	B	1 1	4 4 9 0 0 0	3 9 1 3 9 0 0
C	1 1	4 4 9 3 4 0	3 9 1 3 4 6 0	D	1 1	4 4 9 2 9 0	3 9 1 3 2 2 0

VERBAL BOUNDARY DESCRIPTION

T. 29 S., R. 41 E., MDBL Sec. 34 and 35 ; Red Mountain, Calif. 7.5' USGS Quadrangle, 1967 (Photoinspected 1973) - San Bernardino County. Latitude and longitude readings incorporating the proposed district are: from 117 degrees 33' 28" to 117 degrees 34' 10" longitude and 35 degrees 21' 35" to 35 degrees 22' 20" north latitude.

LIST ALL STATES AND COUNTIES FOR PROPERTIES OVERLAPPING STATE OR COUNTY BOUNDARIES

STATE	CODE	COUNTY	CODE
STATE	CODE	COUNTY	CODE

11 FORM PREPARED BY

NAME / TITLE

Russell L. Kaldenberg, Resource Area Archaeologist

ORGANIZATION | DATE

U.S. Bureau of Land Management (714) 256-3595

STREET & NUMBER | TELEPHONE

831 Barstow Road

CITY OR TOWN | STATE

Barstow, California 92311

12 CERTIFICATION OF NOMINATION

STATE HISTORIC PRESERVATION OFFICER RECOMMENDATION

YES X NO___ NONE___

STATE HISTORIC PRESERVATION OFFICER SIGNATURE

In compliance with Executive Order 11593, I hereby nominate this property to the National Register, certifying that the State Historic Preservation Officer has been allowed 90 days in which to present the nomination to the State Review Board and to evaluate its significance. The evaluated level of significance is ___National X State ___Local.

FEDERAL REPRESENTATIVE SIGNATURE

TITLE | DATE

FOR NPS USE ONLY

I HEREBY CERTIFY THAT THIS PROPERTY IS INCLUDED IN THE NATIONAL REGISTER

DATE

DIRECTOR, OFFICE OF ARCHEOLOGY AND HISTORIC PRESERVATION

ATTEST: DATE

KEEPER OF THE NATIONAL REGISTER

GPO 899-214

Form No. 10-300a
(Rev. 10-74)

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E	11	448660	3913220	F	11	448270	3913440
G	11	448290	3913740				

Appendix C

Determination of Eligibility

Notification

E.O.11593

DETERMINATION OF ELIGIBILITY NOTIFICATION

NATIONAL REGISTER OF HISTORIC PLACES

OFFICE OF ARCHEOLOGY AND HISTORIC PRESERVATION

NATIONAL PARK SERVICE

Request submitted by: Ed Hastey, Bureau of Land Management

Date request received: July 19, 1976

Name of property: Squaw Spring Well Archeological District State: California

Location: 2 miles west/southwest of Red Mountain, California

Opinion of the State Historic Preservation Officer:

(x) Eligible ( ) Not eligible ( ) No response

Comments: The State Historic Preservation Officer concurs with the opinion of Mr. Ed. Hastey, State Director, Bureau of Land Management, that this area is eligible for inclusion in the National Register.

The Secretary of the Interior has determined that this property is:

(x) Eligible Applicable criteria: (D)

Comments: Squaw Spring Well Archeological District is significant because it "forms one of the principal hubs for a larger network of subsistence and economic activities." Further study of this area will "likely yield important information on regional culture history, on processes of big game hunting and associated ritual, plant food processing (and gathering) and paleo-environmental reconstructions."

( ) Not eligible

Comments:

( ) Documentation insufficient (see accompanying sheet explaining additional materials required)

Acting Chief, Office of Archeology and Historic Preservation

Date: 10/29/76

WASO-185
9/75

Appendix D

Withdrawal Information

TS.

IN REPLY REFER TO:

United States Department of the Interior

2311 (321)

AUG 15 9 40

BUREAU OF LAND MANAGEMENT
WASHINGTON, D.C. 20240

CALIF. STATE OFFICE
SACRAMENTO, CALIF.

August 8, 1974

To	Initial	Date
SD		
Res		
PA		

Action 2/3- 8/3
Return to

Instruction Memorandum No. 74-304
Expires 12/31/74

Jerry coord w Res

To: All SD's, SCD

From: Associate Director

Subject: Public Water Reserves FD 8/26/74

The enclosed information on Public Water Reserves has been developed for use both by Bureau employees and as a public information handout.

The need for Public Water Reserves and the extent of restrictions placed on other uses of these reserves are questions which have long needed clarification. This proposed publication is designed to meet that need.

Please have appropriate members of your staff, including the Public Affairs Officer, review this handout. Public Affairs Officers need not respond separately as both the Division of Lands and Realty and the Office of Public Affairs are cooperating in this effort. Your comments and any suggestions for changes should be received by the Director (320) by August 26, 1974. Final publication should routinely follow.

George L. Turcott

1 Enclosure
Encl. 1 - Public Water Reserves

BARSTOW RESOURCE AREA
BLM

MAY 15 1978

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve Ameri

PUBLIC WATER RESERVES

Introduction:

The purpose of this publication is to provide an explanation, both for the public and government officials, concerning Public Water Reserves (PWR's). Prior to 1926, valuable springs or other such water supplies were on occasion reserved and protected on an individual basis through passage of special laws or issuance of specific public land orders by the Secretary.

The Public Water Reserves described in this publication originated on April 17 1926, when President Coolidge signed an Executive Order creating Public Water Reserve No. 107 withdrawing all public water holes or springs located on unreserved, unappropriated public lands from all forms of settlement, location, sale or entry, and reserved them for the general public use and benefit. This action was designed to aid the development of western lands and resources, particularly the grazing industry, by preventing monopolistic control of available water supplies. Executive Order No. 5106 of May 4, 1929, excluded Alaska from Public Water Reserve No. 107. Subsequently, Executive Order 5389 of July 7, 1930, as amended by PLO 399 of August 20, 1947, was issued withdrawing all hot springs or springs whose waters contained curative properties, in order that these waters could be leased for the public benefit under the provisions of the Act of March 3, 1925 (43 Stat. 1133).

These withdrawals and PLO's established the Public Water Reserves of the United States. These reserves embrace the smallest legal subdivision (40 acres) containing the water or all lands within one-quarter mile of the water if the public lands are not yet surveyed.

Since the creation of Public Water Reserve No. 107, there have been very few changes in the utilization of Public Water Reserves. This publication is designed to answer most basic questions pertaining to the present status of public water

Encl. 1-1

reserves in the context of permissible uses, disposal, etc. See 43 CFR 2311 and BLM Manual 2321 for further details.

Questions and Answers

1. Where are Public Water Reserves located?

Presently, all Public Water Reserves are found in States west of the Mississippi River, except for the States of Arkansas, Louisiana, Missouri, Minnesota, and Alaska which have no Public Water Reserves.

2. May Public Water Reserves be established today?

Yes. Public Water Reserve No. 107 of April 17, 1926, is a blanket and continuing withdrawal attaching to any land which is subsequently determined to fall under the intent of the Order. Any natural or developed water on the public lands capable of producing enough water for public watering purposes, even if constructed by the United States or pursuant to cooperative agreement, may be identified as a Public Water Reserve.

3. Must the water actually be used for public watering purposes in order to . a Public Water Reserve?

No. Actual public use of the water is not mandatory. It is only necessary that the water be needed for public watering purposes (43 CFR 2311.0-3(2)).

4. Under what conditions may a Public Water Reserve be subject to revocation and/or restoration?

In instances where a water supply has subsequently dried up, as many have, or where the spring or water hole proves incapable of providing enough water for use and benefit of the general public, the particular reserve may be subject to revocation and/or restoration to the public domain.

5. What procedures must be followed in revoking and restoring a Public Water Reserve?

Upon request, or on Bureau motion, BLM will make an evaluation to determine whether the Public Water Reserve in question has substantially changed in character so as to no longer serve the purpose for its reservation. If it is determined that the reservation no longer serves its purpose, BLM will then take the appropriate actions to have the reserve revoked and the land restored to the public domain.

6. Is it possible to purchase lands containing Public Water Reserves or to exchange such land for private lands?

Lands within a Public Water Reserve may not be purchased or exchanged for private lands until the withdrawal has been revoked and the lands restored to public domain.

7. Will an application to purchase public lands or to make an entry upon public lands under the Homestead or Desert Land Laws be approved if unreserved springs or waterholes are present?

If there is any spring or waterhole on the lands desired, the applicant must state the location and the size; together with an estimate of the quantity of water in gallons which it is capable of producing daily, and any other information necessary for BLM to determine whether it is valuable or necessary as a Public Water Reserve. If the water is determined to be necessary as a Public Water Reserve, the application cannot be approved for the 40-acre tract containing the water source. Provision is also usually made to insure continued public access to the water across adjacent lands which may be subsequently patented. However, if it is determined that the spring or waterhole is not necessary as a Public Water Reserve, applications for purchase or entry may be approved.

8. Are Public Water Reserves open to location of mining claims?

Under the Executive Order of April 17, 1926, lands contained within a Public Water Reserve are only segregated from location for non-metalliferous minerals. Therefore, claims located for non-metalliferous minerals such as asbestos, olin, and specialty sands are null and void. Claims located for metalliferous minerals such as gold, silver, zinc, and copper could be located on Public Water Reserves if all other requirements are met.

9. May Public Water Reserves be leased for oil and gas development?

It is permissible for Public Water Reserves to be leased for oil and gas development. However, the local BLM office must determine the status and availability of the land in question.

10. Does BLM allow rights-of-way (oil and gas pipelines, electric transmission lines, highways, etc.) on lands which are reserved as Public Water Reserves?

Yes. There are acts which authorize the Secretary, under such regulations as he may determine, to permit the use of rights-of-way through public lands and certain reservations of the United States, including Public Water Reserves.

11. What uses are permitted on Public Water Reserves set aside under the Executive Order of April 17, 1926, having mineral, medicinal, or other curative properties (43 CFR 2311.4)?

The Act of March 3, 1925, authorizes the issuance of leases for the erection of bath houses, hotels, or other improvements for the accommodation of the public for a maximum of 20 years on lands near or adjacent to mineral, medicinal, or other springs located upon unreserved public lands or public lands withdrawn for the protection of such springs.

12. Who may make application for use of lands included in a Public Water Reserves?

Water Use:

Any citizen or association of citizens of the United States or any corporations within the United States who may desire to improve the productivity of any water hole or source of water supply within the boundaries of any Public Water Reserve, or to conduct waters from the Reserve to a place more convenient for public use, may apply.

Encl. 1-4

Other Uses:

An application for a lease of such lands for uses permitted under the Act of March 3, 1925, may be made by any responsible person or association, which includes private corporations and municipalities.

13. What is the application procedure for using water and/or lands withdrawn as Public Water Reserves (Act of February 15, 1901 (43 U.S.C. 959)?

1. Applicant must submit an application, corroborated by at least two persons, setting forth in detail the plan for improvement and case of the Public Water Reserve and the public necessity for such improvement (43 CFR 2311.3).

2. Applicant must submit maps and field notes whenever water is to be conducted outside of the Reserve.

3. Applicant must execute requisite stipulations and agreements as determined by the authorizing officer of the proper office.

14. What is the application procedure for leasing of public lands near or adjacent to springs, for bath houses, hotels, or other improvements?

1. If the applicant is either a municipality or a private corporation, it must be shown that taking of the lease has been duly authorized by its governing body.

2. Applicant must submit in detail a plan which specifies the following:

(1) The purpose for which land is intended to be used;

(2) An accurate description of the land desired; and

(3) Detail as to the proposed improvement, including estimated cost of construction and maintenance.

Public Water Reserve No. 22 California

ORDER OF WITHDRAWL

Public Water Reserve No. 22, California No.4

Under a Pursuant to the provisions of the act of Congress approved June 25, 1910 (Picked Act), entitled "An act to authorize the President Pick of The United States to make withdrawls of public lands in certain cases, "as amended by act of Congress approved August 24, 1912 (37 stat., 497), it is hereby ordered that the lands hereinafter described be, and the same are hereby, withdrawn from settlement, location sale, or entry, and reserved for public use.

Mt. Diablo Meridian.

T. 29 S., R. 37 E., Sec. 35, S$\frac{1}{2}$ of NE$\frac{1}{4}$

T. 28 S., R. 40 E., Sec. 20 SE$\frac{1}{4}$ of SW$\frac{1}{4}$

T. 23 S., R. 41 E., Sec. 11 S$\frac{1}{2}$ of SE$\frac{1}{4}$

T. 29 S., R. 41 E., Sec. 34 N$\frac{1}{2}$

T. 30 S., R. 41 E., Sec. 13, E$\frac{1}{2}$ of NE$\frac{1}{4}$

T. 22 S., R. 42 E., Sec 2, SE$\frac{1}{4}$ of SE$\frac{1}{4}$;
Sec. 32. W$\frac{1}{2}$ of NW$\frac{1}{4}$

T. 24 S., R. 42 E., Sec. 24, W$\frac{1}{2}$

T. 30 S., R. 43 E., Sec. 2, N$\frac{1}{2}$, N$\frac{1}{2}$ of s$\frac{1}{2}$;
Sec. 3, E$\frac{1}{2}$ of NE$\frac{1}{4}$

T. 24 S., R. 44 E., (unsurveyed) All Lands within one-quarter of a mile of a well located approximately in what will probably be when surveyed Sec. 22

Public Water Reserve No. 22, California No. 4.

T. 29 S., R. 44 E., Sec. 22, SE¼ of NW¼;
Sec. 23, S½ of NW¼.

T. 26 S., R.45 E., All lands within one-quarter mile of layton
(unsurveyed) Layton Spring located approximately in what will probably be when surveyed Sec. 18.
All lands within one-quarter mile of Lone Willow Spring located approximetely in what will probably be when surveyed Sec. 26.

T. 31 S., R. 45 E., Sec. 13 SW¼

T. 32 S., R. 45 E., Sec. 24, SE¼ of SE¼

T. 32 S., R. 47 E., Sec. 21, NE¼ of SW¼;
Sec. 34, NW¼ of NW¼.

San Bernardino Meridian.

T. 3 N., R. 1 E., Sec. 4, N½ of NE¼.

T. 6 N., R. 2 E., All lands within one-quarter mile of Willow Spring
(partly surveyed) located approximately in what will probably be when surveyed Sec. 6.

T. 10 N., R. 2 E., Sec. 22, SW¼ of NW¼, NW¼ of SW¼.

T.12 N., R. 2 E., All lands within one-quarter mile of a Spring
(partly surveyed) located approximatley in what will probably be when surveyed Sec. 7.

T. 17 N., R. 2 E., Sec. 17, SW¼ of SW¼

T. 3 N. R. 3 E., All lands within one-quarter mile of Two Hole
(partly surveyed) Springs located approximately in what will probably be when surveyed Sec. 20.

Public Water Reserve No. 22, California No. 4.

T. 13 N., R. 3 E., Sec. 10, SE¼ of NW¼

T. 17 N., R. 3 E., Sec. 22, SE¼ of NE¼, NE¼ of SE¼
(Partly Surveyed) SEc. 23, SW¼ of NW¼, NW¼ of SW¼

T. 18 N., R. 3 E., Sec. 23, NW¼

T. 1 N., R. 4 E., Sec. 5, All.

T. 2 N., R. 4 E, All lands within one-quarter mile of Saddlerock
(unserveyed) Spring located approximately in what will probably be when surveyed Sec. 15.

T. 4 N., R. 4 E., Sec. 24 SE½;
Sec. 25 N½.

T. 16 N., R. 4 E., Sec. 10, SE¼ of SE¼.

T. 21 N., R. 7 E., Sec. 11, S½ of SW¼;
Sec. 14, N½ of NW¼;
Sec. 23, N½ of NW¼;
Sec. 35, SW¼ of NW¼, NW¼ of SW¼.

T. 2 N., R. 9 E., Sec. 31, NW¼ of SE¼,

T. 10 N., R. 9 E., Sec. 32, NE¼ of SE¼.

T. 6 N., R.17 E., Sec. 11, All
Sec. 13, NW¼ of NW¼

T. 5 N., R. 18 E., Sec. 6, S½ of SE¼.

T. 8 N., R. 18 E., All lands within one-quarter mile of Fanner
(unsurveyed) Springs located approximately in what will probably be when surveyed Sec. 29.

T. 4 N., R. 23 E., Sec. 23, SE¼ of NW¼.

T. 2 N., R. 24 E., All lands within one-quarter mile of Chambers
(unserveyed) Well located approximately in what will probably be when surveyed Sec. 8.

T. 3 N., R. 24 E., All lands within one-quarter mile of Whipple
(unsurveyed) Well located approximately in what will probably be when surveyed Sec. lo.

T. 4 N., R. 24 E., Sec. 17, $E\frac{1}{2}$ of $NE\frac{1}{4}$.

T. 2 N., R. 25 E., All lands within one-quarter mile of a Spring
(unserveyed) located approximately in what will probably be when surveyed Sec. 15.

T. 2 N., R. 26 E., All lands within one-quarter mile of Home Tanks
(unserveyed) located approximately in whatwill probably be when surveyed Sec. 2.

T. 3 N., R. 1 W., Sec. 12, $NE\frac{1}{4}$ of $SE\frac{1}{4}$

T. 4 N., R. 1 W., Sec. 10, $NE\frac{1}{4}$ of $NE\frac{1}{4}$
Sec. 11, $NW\frac{1}{4}$ of $NW\frac{1}{4}$

T. 6 S., R. 16 E., All lands within one-quarter mile of Corn Springs
(partly surveyed) located approximately in what will probably be when surveyed Sec. 28.

President.

Original signed by Woodrow Wilson
8 August 1914

Appendix E

Fence Construction Contracting Procedures

Procedures for selecting the type or placement of a fence.

The procedures listed below should be followed when selecting the type or placement of fences.

1. Evaluate what the purpose of the fence is. Example: Is it to completely restrict vehicular access and/or pedestrian access? Is the fence to guide vehicles and/or pedestrians away from a site area, but not to completely close access?

2. Determine the land status and who has rights of entry. Example: Are mining claims located in the area? Until an area is withdrawn from mineral location, claimants have right of entry. Do private individuals or agencies such as the California Department of Fish and Game have legitimate rights of entry? Is the area leased for grazing?

3. Determine which environmental factors should be considered (eg. wildlife, botany and scenic-visual, etc.).
   a) What animals are located in the area and what are their needs? For example, if cattle are present cattleguards may be necessary. This information can be obtained from EAR's and EIS's, Management Framework Plans and specialists familiar with the area.

   b) What is the vegetative cover in the area? Are rare or endangered plants recorded at the site area? In some cases, if the vegetation is dense or rare and endangered plants are recorded, the degree of fence construction may have to be limited.

c) Scenic-visual factors should be considered. What type of fence would be aesthetic and yet unobtrusive visually. In some cases, such as across a road, a fence should be visible.

4. Once that the above questions are answered the archaeologist can decide what type of fence would be the most functional and yet practical, or the district engineer and/or landscape architect can be consulted for recommendation of specific types of fences.

   a) If the archaeologist wants to recommend a type of fence there are several available sources that can be consulted. A good source is the Sears Suburban, Farm and Ranch Catalog. Both wooden fences and wire fences are described and prices for materials are provided. Fencing companies can also supply information on the type of fencing they stock and the prices for materials and labor. Copies of fencing contracts which the BLM had solicited may also be available in the Riverside District Office's Central Files or Operation Files. The contract files have schematics of fences, the federal standards for fencing material and construction, a breakdown of the materials needed, a BLM engineer's estimated cost of the fencing materials and labor, and the bids of the companies.

The Government Service Administration (GSA) Supply Catalog lists some fencing material, but the parts are itemized and the selection is very limited. Essentially, if the archaeologist wants to know the cost of specific material used in barbed wire fences the information is given in the GSA Catalog.

Following the selection of the type of fencing, the archaeologist should provide the landscape architect and the engineer with a detailed description of the fence and the dimensions. The landscape architect can then make detailed recommendations. The engineer can draw detailed schematics and provide specific cost information. The engineer can also assure that the federal standards for fencing material and construction are met. The estimate is 2-3 man days for the engineer's time.

b) If the archaeologist wants the district engineer to design the fence, the archaeologist should provide the engineer with the length of the fence needed and the purpose of the fence, along with requirements such as a gate or cattleguards. In some cases a landscape architect may recommend which type of fence is appropriate and the engineer can then do the detailed schematics, breakdown of needed materials, an itemized cost of materials and an overall estimated cost.

5. Prepare and EAR or supplemental EAR that addresses the planned fencing.

In most cases the archaeologist could prepare the EAR and obtain input and review from the other resource specialists. If the environmental concerns have been taken into consideration in the selection and placement of the fence, preparation of the EAR can be a formality. If not, adjustments may have to be made and additional time spent on the design and/or placement of the fence.

6. Following the completion and approval of the EAR, the construction of the fence may be handled by BLM, contract to a fencing company, or with volunteer public service groups.

   a) If BLM constructs the fence, BLM must purchase the necessary fencing supplies, provide the equipment required to construct the fence and allot man days to construct it. If the equipment or supplies can be obtained from GSA and are more than $25.00, then the equipment or supplies must be ordered through GSA. If the necessary supplies and equipment are not listed in the GSA Supply Catalog, then bids should be obtained from local fencing companies. In some cases, the district or area office may have a blanket purchase order with a company that carries the required equipment or supplies. The expected man days should be programmed into the Annual Work Plan under Operations.

b) In most cases, it would probably be more efficient to contract with a fencing company. In reviewing previous contracts on file in the Riverside District Office, the contractors often underbid the estimated cost given by the BLM.

c) Volunteers may be willing to contribute their labor to a project if they feel it in their best interest as a public service group. The major problem in this would be the overtime required for BLM operations personnel and schedule coordination between the BLM and the volunteer group.

Fencing is considered a construction activity and therefore is always written as a negotiated contract. If the estimated cost is less than $2000.00, the District Office may process the contract. The archaeologist may solicit the bids. In most cases five bids would be sufficient. Once the bids are obtained, they are given to the appropriate person in Administration for processing. The estimated time for processing is two days.

If the estimated cost prepared by the BLM is greater than $2000 the contract is handled by the Denver Service Center. The estimated time for processing a contract through Denver is three months.

Form 9172-31
(December 1971)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

F-3 - FENCE CONSTRUCTION

1. GENERAL – Using materials specified herein, Contractor shall construct fence in accordance with these specifications and detailed drawings on fence design.

2. INSTALLATION OF POSTS AND BRACES – Depth to which posts shall be placed and spacing of posts and bracings shall be as shown on drawings. Steel posts shall not be used for end panel, corner panel, gate panel, or stress panel posts. All wood posts shall be set in dug holes, except that wood line posts may be driven upon written authorization by the Contracting Officer. Steel posts shall be driven except where rock formations prohibit driving. Posts which are driven shall be free of damage when in place, and any driven post which is split, twisted, or bent, or which has a broomed top shall be removed and shall be replaced with an undamaged post.

When wood posts are to be set in dug holes, holes for posts shall be dug to depth at which posts are to be set and of sufficient diameter to allow setting posts with adequate open space around each post to permit tamping of backfill for full depth of hole. Space around each post shall be filled gradually and uniformly with soil and packed firmly from bottom of hole to ground surface.

Except where rock formations prohibit, steel posts shall be driven into ground to depth shown on drawings or until anchor plate is slightly below ground surface. If rock formations prohibit driving of steel posts, holes of the approximate diameter of steel posts and eighteen (18) inches deep shall be excavated or drilled for placement of posts. Post shall then be placed in hole and grouted, if necessary, to make post solid. All posts shall be set in accurate alignment.

Where rock or other unusual conditions make setting of posts in accordance with above two paragraphs impractical, Contractor may request, in writing, use of figure fours and rock jacks in specific locations. Where such request is granted by Contracting Officer, figure fours shall be used in lieu of steel posts, and rock jacks in lieu of wood posts; except that where a series of figure fours are required, a rock jack shall be substituted for every fifth figure four. Figure fours and rock jacks shall be constructed as shown on drawings.

Corner post assemblies, gate post assemblies, and stress panels shall be constructed to conform with the design on drawings. Stress panels shall be constructed on crests of all hills and at a maximum distance of eighty (80) rods apart where barbed wire only is to be used and forty (40) rods apart where woven wire is to be used. Stress panels are required at all points between which wire is to be stretched.

3. INSTALLATION OF WIRE – Wire shall be tightly and uniformly stretched and snugly stapled to wood posts and attached to steel posts with standard wire clips. In stretching wire, excessive tension shall be avoided. Staples shall be driven into wood until staple comes in contact with wire against post, but not tight enough to crimp wire or prevent free movement of wire between post and staple. Staples shall not be driven parallel to grain of wood. Woven wire shall be attached to posts at top and bottom wires and at a minimum of two intermediate horizontal wires. Fence fabric and barbed wire shall terminate at each end post, gate post, corner post, and stress panel. Each line of barbed wire and each longitudinal wire of fence fabric shall be wrapped around post and spliced to itself with at least four (4) turns.

When wire stays are used, they shall be uniformly spaced between adjacent posts and inserted in successive fence wire strands in such a manner that proper wire spacing will be maintained throughout length of fence. If wood stays are used, they shall be uniformly spaced between adjacent posts and shall be securely fastened to each fence wire by means of smooth wire ties in such a manner that proper wire spacing will be maintained throughout.

Where fence crosses depressions, dips, swales, or other low areas and ground between adjacent posts is more than twenty (20) inches below bottom wire of a barbed wire fence or ten (10) inches below bottom strand of a woven wire fence, an additional strand or strands of barbed wire shall be stretched between successive posts or entire fence shall be weighted down with a rock deadman. Rock deadmen shall weigh a minimum of fifty (50) pounds per fence panel and shall be sufficiently heavy to keep wire from pulling posts from ground. Fence wire strands shall be anchored to deadmen with two or more strands of No. 9 galvanized wire attached to each fence strand to maintain proper spacing.

Form 9172–28
(March 1971)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Name of Contract

F – S – FENCE CONSTRUCTION SPECIFICATIONS SUPPLEMENT

A. GENERAL – Following specification details are in addition to, or modify, *Fence Construction Standard Specifications,* made a part of this invitation for bids and any contract resulting therefrom.

B. LOCATION OF WORK – Work is located in

at sites designated on attached *Work Location Map* which is made a part hereof.

C. DESCRIPTION OF WORK

1. *Type and fabric of fence* – Work consists of constructing ________ rods of
   - a. ☐ Four-wire *(Type A)*
   - b. ☐ Three-wire *(Type B)*
   - c. ☐ Woven-wire *(Type C)*
   - d. ☐ Four-wire antelope *(Type D)*
   - f. ☐ Five-wire antelope *(Type F)*
   - g. ☐ Woven-wire antelope *(Type G)*
   - h. ☐ Other *(describe)*

2. *Source of materials* – Materials are to be furnished by
   a. ☐ Contractor b. ☐ Government
   Materials furnished by Government shall be picked up by Contractor at ____. Materials will be available Mondays through Fridays *(except holidays)* from 9 a.m. to 4 p.m.

3. *Clearing fence lines* – Fence lines are to be cleared by
   a. ☐ Contractor b. ☐ Government c. ☐ No clearing required

4. *Line post ratio* – Line posts shall be
   a. ☐ All steel posts b. ________ steel posts to one wood post c. ☐ All wood posts

5. *Number and type of fence stays*
   a. ________ stays required in each fence panel b. ☐ Wood stays c. ☐ Wire stays
   d. ☐ Wood or wire at Contractor's option e. ☐ No stays required

6. *Number of gates*
   a. ____________ standard wire gap gates b. ____________ special gates
   (1) Description of special gates

7. *Number of cattle guards*
   a. ____________ openings only
   b. ____________ base construction and cattle guard installation only *(Government furnished cattle guard)*
   c. ____________ cattle guard construction, all installation, all materials, and labor to be furnished by Contractor

8. *Number of antelope pass structures*
   a. ____________ installation only *(Government furnished structures)*
   b. ____________ construction, all materials, all installation, and labor to be furnished by Contractor

Appendix F

Types of Fences

Types of Fences

1. FIELD FENCE - This fence is a graduated mesh which is smaller at the bottom than the top and is attached to metal T posts.

Materials:
- a) Field fence mesh
- b) T Posts
- c) Corner posts
- d) Bracing lines for corner posts
- e) Wire clips

Dimensions for a 4' fence:

- a) Graduated mesh that is approximately 1½" X 1½" at the bottom to approximately 4" X 8" at the top. The height of the mesh is 47".
- b) 10' from pole to pole
- c) Corner post 2 3/8' in diameter, 6' high
- d) T posts, 6' high
  - Lightweight 101 T posts
  - Heavyweight 133 T posts

Advantages:
- a) Inexpensive
- b) Prevents vehicular and pedestrian access
- c) Practical for placement in remote area
- d) More readily blends into the background than a chain link or wooden fence
- e) Turned upside down, the mesh allows access to small animals

Disadvantages:
- a) Not as sturdy as a chain link fence

Estimated cost per foot: $1.50 This estimate does not consider distances beyond about 25 miles and difficult access.

2. 2 X 4 FENCE - This type of fence is constructed like the field fence. The difference between the two types is the size of the mesh.

Materials:
- a) 2 X 4 mesh
- b) T posts
- c) Corner posts
- d) Bracing lines for corner posts
- e) Wire clips

Dimensions for a 4' fence:
- a) 2" X 4" mesh, 4' high
- b) The remaining dimensions are the same as those for a field fence

Advantages:
- a) Relatively inexpensive
- b) Prevents vehicular and pedestrian access
- c) Practical in remote areas
- d) More readily blends into the background than a chain link or wooden fence.

Disadvantage:
- a) The mesh size does not allow access except to very small animals
- b) More expensive than a barbed wire or field fence
- c) Not as sturdy as a chain link fence
- d) Can be climbed more easily than a field fence

Estimated cost per foot: $2.20. This estimate does not consider distances beyond about 25 miles and difficult access.

3. V-MESH FENCE - This fence is a triangular shaped mesh which is usually attached to round metal posts that are set in concrete. This mesh is designed so that the hooves of cattle and horses do not get caught.

Materials:
a) V-mesh
b) Metal line posts
c) Corner posts
d) Bracing for the corner posts
e) Cement for the line posts and corner posts
f) Wire clips

Dimensions for a 4' fence:
a) V-mesh about 1½" X 3", 50" high
b) 10' from pole and pole
c) Corner posts 2 7/8" in diameter, 7' high
d) Line posts 1 7/8" in diameter, 6' high

Advantages:
a) Good for areas where cattle or horses are a concern
b) Sturdier than barbed wire, 2 X 4 and field fences.

Disadvantages:
a) Expensive
b) Impractical for placement in remote areas
c) More visible than barbed wire, field or 2 X 4 fencing

Estimated cost per foot: $3.00 - $3.50. This estimate does not consider distances beyond about 25 miles and difficult access.

4. CHAIN LINK FENCE - This is a sturdy fence which is common in many areas.

Materials:
a) Chain link mesh
b) Corner posts (metal)
c) Line posts (metal)
d) Top rail (Optional)
e) Bracing for corner posts
f) Cement for corner posts and line posts
g) Wire clips
h) Fittings

Dimensions for a 4' fence:
a) Chain link of 2" mesh
b) Corner posts 2 3/8" in diameter, 7' high
c) Line posts 1 7/8" in diameter, 6' high
d) Top rail 1 3/8" in diameter, about 10' in length
e) 10 between poles

Advantages:
a) Very sturdy
b) Barbed wire arms are easily attached
c) Prevents vehicular and pedestrian access.
d) Common

Disadvantages:
a) Expensive
b) More visible than barbed wire, field, 2 X 4 or wooden fence
c) Impractical for placement in remote areas
d) Does not allow access to most animals

Estimated cost per foot: $3.00 - $3.50. This estimate does not consider distances beyond about 25 miles and difficult access.

provide some direction. Once the final design has been reviewed and found to be satisfactory to both the archaeologist and the Sign Committee, approval must be obtained from the District Manager and the State Office.

1) Unless the sign is of a very special material, the sign can be made at the BLM Sign Shop in Kingman, Arizona. The Sign Coordinator in Operations processes these signs.

2) If the sign cannot be made at the BLM Sign Shop, then the signs are purchased through Administration. If more than one company can manufacture the sign, bids must be solicited. In the case of Permaloy signs, only one company can manufacture the signs. These signs have proven to be aesthetic and have withstood attempted vandalism. Since they are unobtrusive, archaeologists have preferred them over most other signs. For example, in the Barstow Resource Area, 15 of the signs have been placed at petroglyph locations. None of the signs have been stolen and only two bullet scars have been noted on the signs. Both of these are only trace scars since the bullet richoted elsewhere.

5. BARBED WIRE FENCE - This fence consists of barbed wire strung on metal T posts.

Materials:
a) Barbed wire
b) T posts
c) Corner posts
d) Bracing for corner posts
e) Fence stays
f) Wire clips
g) Concrete for corner posts

Dimensions for a 5' fence:
a) 4* strangs of barbed wire, 12½ and 13 gage wire is available through the GSA Supply Catalog.
b) 6' T posts
c) Corner posts 2 3/8" in diameter, 6' high
d) 10' from pole to pole
e) Fence stays placed between line and corner posts

Advantages:
a) Inexpensive
b) Allows most animals access
c) Prevents vehicular access and to some degree pedestrian access
d) Practical for placement in remote areas
e) More readily blends into the background than most fences.

Disadvantages:
a) May be dismantled fairly easily
b) May not prevent pedestrian access

Estimated cost per foot: $.80. This estimate does not consider distance beyond about 25 miles and difficult access.

* More or less strands may be used.

Appendix G

Types of Fences - Miscellaneous Materials

Types of Fences - Miscellaneous Materials

GATES

1) Field or 2 X 4 Gate
   Materials: 2 end posts, mesh and frame
   Estimated cost: $60.00

2) V-mesh Gate
   Materials: 2 end posts, frame and mesh
   Estimated cost: $75.00

3) Chain Link Gate
   Materials: frame, mesh and end posts
   Estimated cost: $45.00

4) Non-hinged Wire Gate
   Materials: wire or mesh and 2 end posts
   Estimated cost: The price of the materials

BARBED WIRE ARMS - These are extensions which are placed on metal line posts and barbed wire is strung between them. They are not safe for fences below about 6.5 feet. Estimated cost: $3.10 each.

BUMPER POSTS - These are 3½" - 4" in diameter hollow metal posts that are usually filled with cement. They are useful in areas where vehicular access is not allowed but pedestrian access is desired. Estimated cost: $18.85 each. The estimate does not include the price of the cement.

CABLE OR WIRE ROPE - Cable or wire rope is listed in the GSA Supply Catalog (Group 40). Only two types are available, clothesline wire and seizing wire. In almost every instance the seizing wire would be more practical because it is stronger and heavier. Estimated cost: Clothesline wire (.135" diameter)
$1.05 per 50' coil
Seizing wire (1/8" diameter), 530 lb. test, $14.60 per 250' coil

CHAIN - Both welded and weldless chain is listed and specifications are given in the GSA Supply Catalog. In cases where access to vehicles is being restricted, welded chain which comes in ¼", 3/8" and ½" diameters is probably the most practical. Weldless chain would be more practically placed in an area where stress on the chain is not anticipated.
Estimated cost: ¼" welded chain, $.35 per foot
3/8" welded chain, $.75 per foot
½" welded chain, $1.40 per foot

350 lb test weldless chain, $19.10
per 500' reel
425 lb test weldless chain, $40.00
per 500' reel

POLES, TELEPHONE OR ELECTRIC

1) Contact the telephone company serving the area.

For example, Pacific Telephone gives away used telephone poles. The individual or agency, however, must put their name on a list and they will be contacted when poles are available. The telephone number is (714) 683-1111

2) Contact the utility company in the area.

For example, Southern California Edison Co. maintains a pole yard at 6990 N. Orange in North Long Beach. Excess poles may be purchased at $.75 per foot. All poles must be taken from the yard on an open truck and no sawing is permitted in the yard. The manager of the pole yard must be contacted in order to make arrangements. The telephone number is (213) 633-6490.

RAILROAD TIES

1) Contact a railway company in the area.

For example, in San Bernardino all arrangements must be made through the Superintendent, Santa Fe Railway Co., 1170 W. Third, San Bernardino, CA 92410. This branch of the Santa Fe Railway Co. does not sell to individuals.

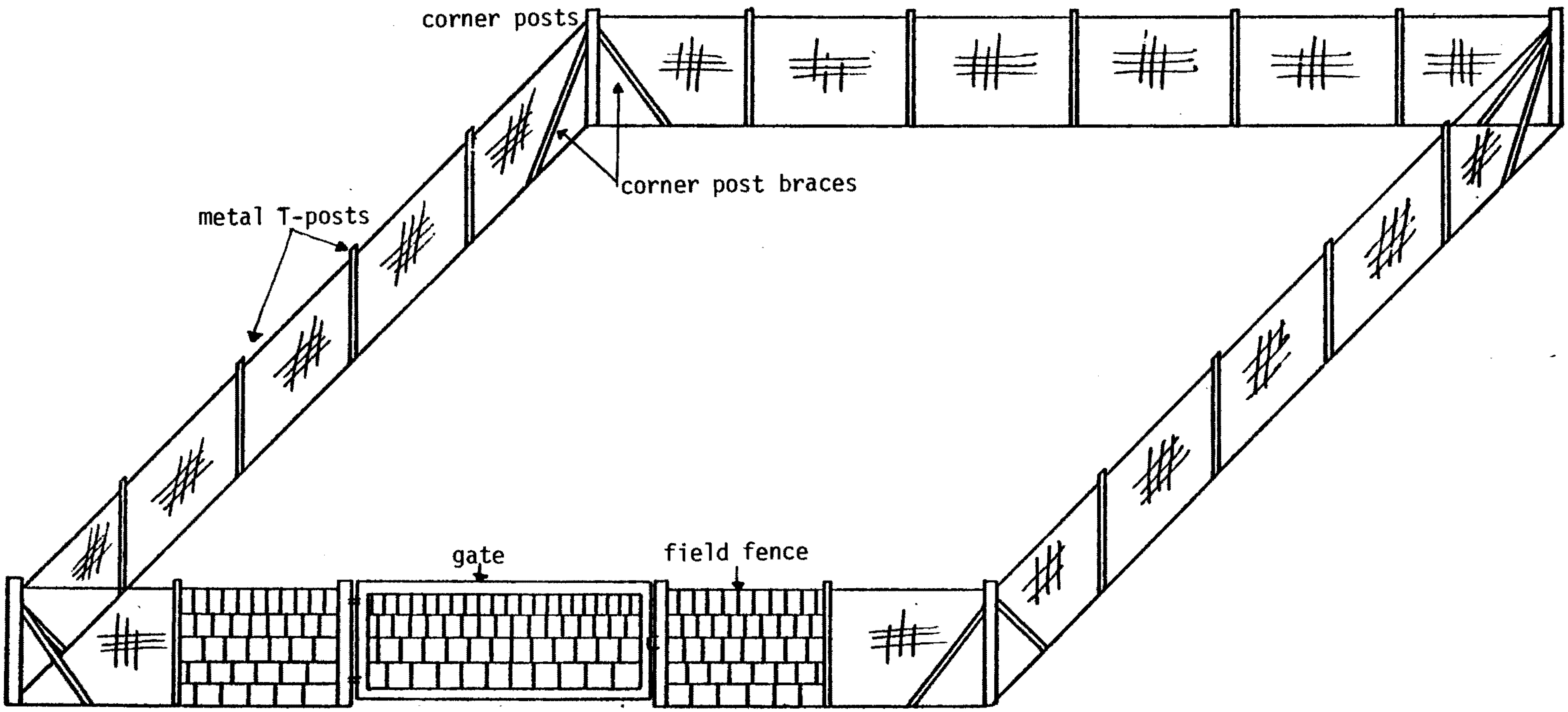
Railroad ties are sold out of the Los Angeles Santa Fe Railway Office to individuals and agencies. Railroad ties are sold when available. There is no list. One would have to routinely call in order to find out if the ties are available. The ties sell for $3.00 each and are from 8' - 9' long. They weigh from 110 lbs up to 300 pounds. Only 40 ties can be purchased at a time. The telephone number is (213) 628-01111, ext. 2721.

2) Contact local lumber yards.

Appendix H

Proposed Fence

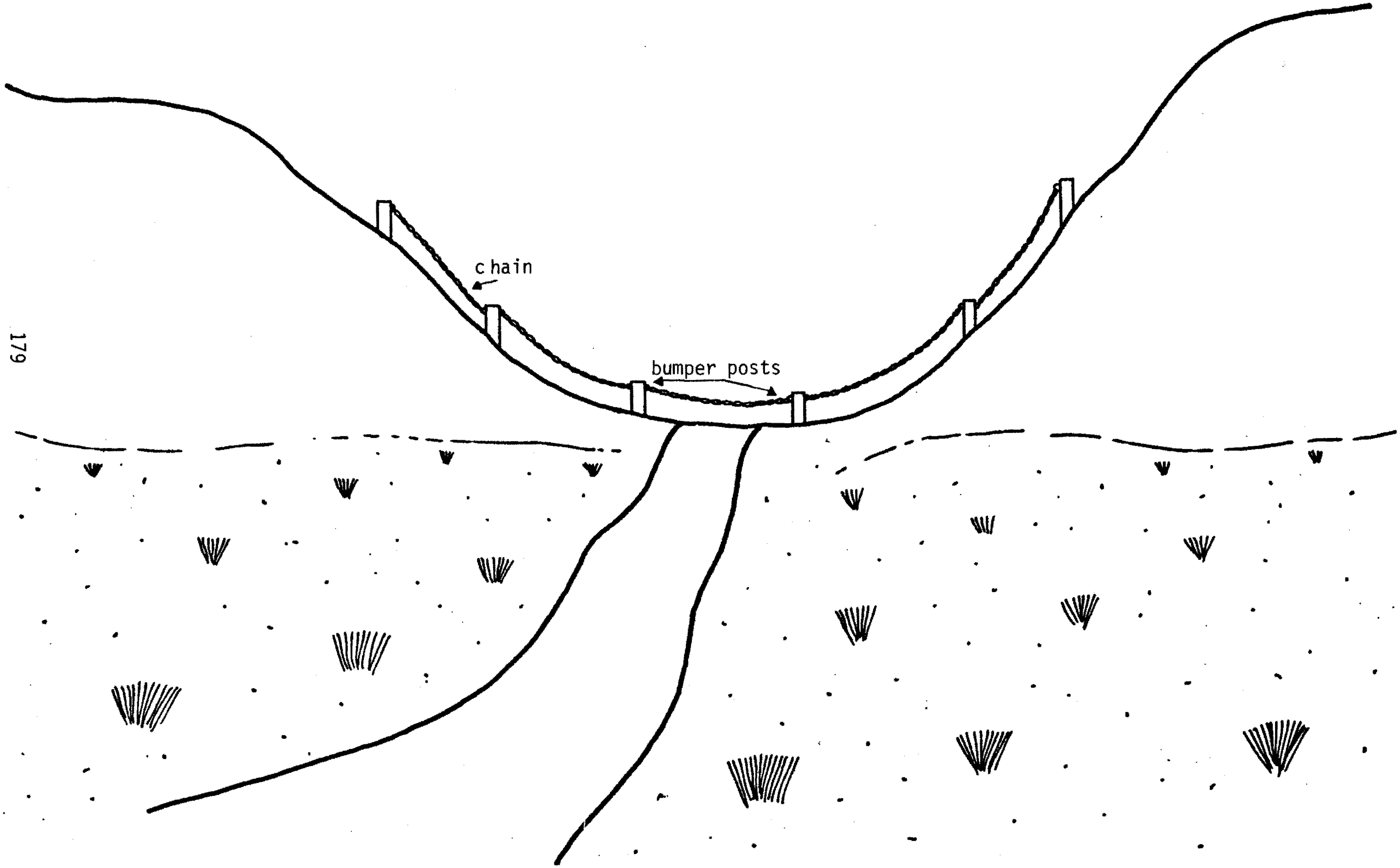
Field Fence--consists of a graduated mesh that is approximately 1 1/2" x 1 1/2" at the bottom and increases in increments to approximately 4" x 8" at the top. This mesh would be inverted--installed with the larger openings at the bottom--to allow the free passage of small animals. The mesh would be secured to metal T-posts (6' high) with wire clips. The T-posts would be set on 10' centers, and would be driven into the ground to a depth of approximately 1 1/2'. The height of the mesh is 47". Corner posts are hollow metal pipes, 2 3/8" in diameter and 6' high. They would be supported laterally by diagonal metal braces. One gate would be installed. This gate would consist of field fence (inverted) stretched on a metal pipe frame. The gate would be hung on a corner post and would latch to a second corner post.



Appendix I

Proposed Chain Barrier

This barrier would consist of lengths of chain stretched between several bumper posts. The chain could be in links of 1/4", 3/8", or 1/2" diameters. The bumper posts would be 3 1/2" - 4" diameter metal posts filled with cement. The posts would be three feet high. This chain-and-post barrier would be installed in a natural saddle and would continue up either side of the saddle for a sufficient distance to prevent vehicles from driving around either end.



Appendix J

Procedures for Sign Design

Signs

A. Standard BLM signs or regulatory signs

Section 9130 of the BLM Manual addresses the design standards and provides examples of different types of signs. Subsection 9134 is a sign index of the signs that are available from the Denver Service Center. The signs are requisitioned through administration.

The Division of Operation at the Riverside District Office also retains files on signing and lists of signs that are available or have been ordered in the past through their office. Operations also maintains a wareyard in Riverside and some common signs may be picked up there. If a particular sign is listed on the Operation files but is not available in Riverside, the sign may be ordered through the Sign Coordinator in Operations from the BLM Sign Shop in Kingman, Arizona. According to the Sign Coordinator there is no cost for these signs.

B. Non-standard Signs

If a non-standard sign is required, then the archaeologist must coordinate with the Sign Committee. At the Riverside District Office, the Staff Recreation Specialist, Interpretive Specialist, Landscape Architect and Sign Coordinator form the committee. The archaeologist should design the needed sign and indicate dimensions, materials, etc. The standards and requirements provided in Section 9130 of the BLM Manual can

Appendix K

Closure Signs

6292.3(C-067)
6441
6730

Riverside District Office
1695 Spruce Street
Riverside, CA 92507

California Association
4-Wheel Drive Clubs, Inc.
Attn: Art Sealey, President
Northern Division
4429 Crestridge Road
Fair Oaks, CA 95628

Dear Mr. Sealey:

Enclosed is a copy of the Federal Register Publication changing the vehicle use designation in the Squaw Spring area near Red Mountain, CA., from "existing roads and trails" to "closed area."

During recent months, a substantial amount of vandalism has been occurring to both the significant cultural resources and the wildlife water catchment near Squaw Springs. Our cultural resource activity plan for the Squaw Spring archaeological district has recommended emergency measures to limit vehicle access to the area which would help prevent vandals from further degrading this significant area. It should be noted that the area is little used by recreation vehicles. The dead end road into the site is only used by those seeking to enter the area for a specific purpose. Unfortunately, that purpose in recent months has been to the detriment of the significant values in the area.

Several members of your sister club, CORVA, have discussed this closure with our staff. They completely agree with the proposal and have volunteered their labor to erect a vehicle barrier. Consequently, we have decided to go forward with the federal register notice, which will become effective upon publication.

I felt it appropriate to provide you with a personal copyoff the notice and would be happy to answer any questions you may have.

BARSTOW RESOURCE AREA
BLM

JAN 5 1978

Sincerely yours,

GERALD E. HILLIER

Gerald E. Hillier
District Manager

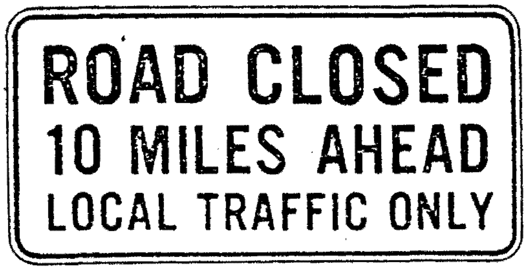
Enclosure

Givens/ps/12-06-77

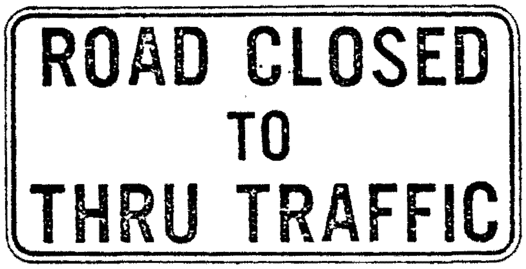
C-067 COPY

9132 - ROAD SIGNS

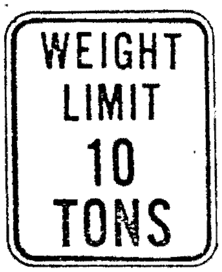
Regulatory Signs — Movement



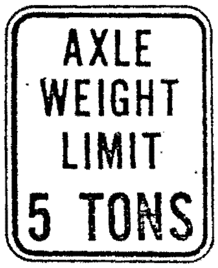
R11-3
60" x 30"



R11-4
60" x 30"

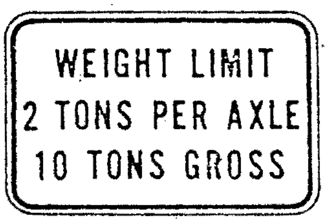


R12-1
24" x 30"

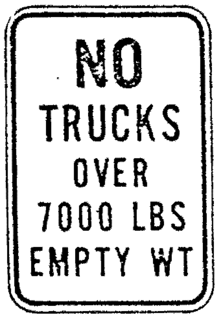


R12-2
24" x 30"

R11-2
48" x 30"

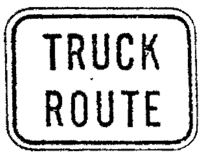


R12-4
36" x 24"



R12-3
24" x 36"

R15-1
48" x 9"
(drilled for 90-degree mounting)



R14-1
24" x 18

REFLECTORIZATION MANDATORY (FOR ALL SIGNS ON THIS PAGE).

R & W DESIGNATION & NUMBER FROM REGULATORY & WARNING SIGN LISTING IN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, DEPARTMENT OF TRANSPORTATION, 1971. USE LETTER, SIZE & NUMBER DESIGNATION TO ORDER FROM SIGN SHOPS.

Form 9130–3
(April 1971)

U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SIGN REQUISITION

7. Sign Description

1. State

2. District

3. Requisition No.

4. Project and/or Sign No.

5. Benefiting Activity

6. No. Signs to be Made

8. Face of Sign

9. Reverse of Sign

10. Site Location

11. Road or Trail Designation *(give name and number)*

12. Vehicle Speed

13. Road Surface

14. Approximate Date to be Erected

16. Special Instructions

15. Sketch of Location

N

W

E

S

FOR SHOP USE ONLY

Date Received	Initials	Shop
Finished Dimensions		Board Feet
Shop Cost		Shipping Costs

Date Finished	Initials	Date Shipped	Initials

17. Requisition Approvals

District	Signature	Date
State	Signature	Date

Instructions on reverse

UNITED STATES GC RNMENT
Memorandum

DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
831 Barstow Road
Barstow, CA 92311

IN REPLY REFER TO:
6441 (C-067.23)

To : District Manager, Riverside   Date: OCT 5 1977

FROM : Area Manager, Barstow Resource Area

SUBJECT : Emergency Closure of Squaw Spring Archaeological District to Vehicular Traffic

Pursuant to amended Executive Order 11644, Section 9, signed by President Carter in April 1977, it would be appropriate to initiate efforts to close the Squaw Spring Archaeological District to vehicular access.

This request for emergency closure is based upon the following circumstances:

1. The Squaw Spring Archaeological District is located within the Red Mountain MFP area and was identified as a resource of high cultural value. This district was nominated to the National Register of Historic Places and was determined to be eligible (36 CFR 800).

2. This area represents the most fragile and the most representative of various types of sites in the Red Mountain MFP area. Varieties of sites within the district range from villages with house circles, petroglyphs, "hunting blinds", to historic resources dating fromthe latter portion of the 19th century.

3. Acute vandalism in the form of unauthorized, clandestine excavation has occurred at two sites beginning in February 1977 and continuing until May 1977. This activity did irrepareable damage to the internal integrity of the resource. Access was by an ORV.

4. On August 14, 1977, the area archaeologist noted that an area atop a ridge with a very large and important village site, with house circles, had been impacted by ORV use. A circular rut had been created by ORV play behavior on the site; fortunately no house circles were damaged. It was also noted that collecting of artifacts had recently occurred due to the presence of pottery sherds being atop a large boulder.

5. The BLM has funded an activity plan to determine appropriate activities and plans for the ultimate utilization of the section of land in which Squaw Spring exists. Conclusions from that study indicate that: 1. the area should be withdrawn from mining claims; 2. the access road leading into the site area should be closed and gated; 3. the completion of the National Register nomination should occur with haste

4. additional scientific research should be conducted to determine the subsurface areal extent of the sites: 5. and a protection and interpretive signing program should be implemented to insure that the high cultural values within the district are better known by the desert-users.

6. A gallinaceous guzzler at the entrance to the archaeological district is one of the best in the habitat area and services the local quail, chukar, and dove population. The California Department of Fish and Game have indicated that within 200 yards of the guzzler, access should be closed to visits of time periods of greater than 30 minutes.

It is therefore proposed to close the Squaw Spring Archaeological District to ORV entry as an initial step towards ensuring adequate site protection. The closure will provide greater assurances that additional site disruption as the result of ORV access and utilization will be greatly reduced.

TERRY L. PLUMMER ACTING

Kaldenberg/ps/9-22-77

UNITED STATES GOVERNMENT

Memorandum

DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Riverside District Office
1695 Spruce St.
Riverside, CA 92507

IN REPLY REFER TO:
6441 (C-067.23)
6500

TO : State Director (C-930)   Date:

FROM : District Manager, Riverside

SUBJECT: Closure of Squaw Spring Archaeological District to Vehicular Access.

Pursuant to amended Executive Order 11644, Section 9, signed by President Carter in April 1977, it would be appropriate to initiate efforts to close the Squaw Spring Archaeological District to vehicular access.

This request for emergency closure is based upon the following circumstances:

1. The Squaw Spring Archaeological District is located within the Red Mountain MFP area and was identified as a resource of high cultural value. This district was nominated to the National Register of Historic Places and was determined to be eligible (36 CFR 800).

2. This area represents the most fragile and the most representative of various types of sites in the Red Mountain MFP area. Varieties of sites within the district range from villages with house circles, petroglyphs, "hunting blinds", to historic resources dating from the latter portion of the 19th century.

3. Acute vandalism in the form of unauthorized, clandestine excavation has occurred at two sites beginning in February 1977 and continuing until May 1977. This activity did irrepareable damage to the internal integrity of the resource. Access was by an ORV.

4. On August 14, 1977, the area archaeologist noted that an area atop a ridge with a very large and important village site, with house circles, had been impacted by ORV use. A circular rut had been created by ORV play behavior on the site; fortunately no house circles were damaged. It was also noted that collecting of artifacts had recently occurred due to the presence of pottery sherds being atop a large boulder.

5. The BLM has funded an activity plan to determine appropriate activities and plans for the ultimate utilization of

the section of land in which Squaw Spring exists. Conclusions from that study indicate that: 1. the area should be withdrawn from mining claims; 2. the access road leading into the site area should be closed and gated; 3. the completion of the National Register nomination should occur with haste; 4. additional scientific research should be conducted to determine the subsurface areal extent of the sites; 5. and a protection and interpretive signing program should be implemented to insure that the high cultural values within the district are better known by the desert-users.

6. A gallinaceous guzzler at the entrance to the archaeological district is one of the best in the habitat area and services the local quail, chukar, and dove population. The California Department of Fish and Game have indicated that within 200 yards of the guzzler, access should be closed to visits of time periods of greater than 30 minutes. Recently, deer and Desert Bighorn Sheep sightings have occurred by CDFG personnel.

It is therefore proposed to close the Squaw Spring Archaeological District to ORV entry as an initial step towards ensuring adequate site protection. The closure will provide greater assurances that additional site disruption as the result of ORV access and utilization will be greatly reduced and wildlife values will be protected.

BLM Billing Code $4310-84

DEPARTMENT OF THE INTERIOR

Bureau of Land Management

California

ORV DESIGNATION FOR RANDSBURG/JOHANNESBURG
(SQUAW SPRING)

The California Desert Vehicle Program (BLM's Interim Critical Management Program for vehicle use on the California Desert) restricts area #14, (Red Mountain/ Cuddeback), to Existing Vehicle Routes.

The unimproved access route into Squaw Spring, in Area #14, is now designated as closed to vehicle use beginning at a point approximately 200 yards north of Squaw Spring wildlife guzzler, A-91, to the end of the road, a total distance of approximately 0.7 miles. Foot travel and loitering within the immediate area of the wild-life guzzler will be restricted to a maximum of 30 minutes. Camping within the closed area is prohibited

This closure is situated near the town of Red Mountain, California, in the Mojave Desert at the following location:
San Bernardino Base and Meridian, California
T. 29 S., R. 41 E., Sec. 34, SW¼SW¼NE¼, N½SE¼

The purpose of the road closure is to protect cultural and wildlife values associated with Squaw Spring from unneces-sary damage. This closure will provide for better resource management and will allow for the programmed implementation of the Squaw Spring Activity Plan.

The area contains unique cultural values that are candidates for the National Register of Historic Places (80 Stat. PL 89-665). These warrant special protection from inordinate damage which will destroy the integrity of the site complex. Damage is presently taking place. Additional damage to the sites will significantly reduce their scientific value.

The wildlife guzzler, A-91, represents a critical water source for small birds and some large mammals. The primary species of concern are the Mourning Dove, Gambel's Quail, Chukar, deer, and Desert Bighorn Sheep. This guzzler is the only reliable wildlife water source for an area in excess of 100 square miles.

The closed designation will be effective immediately and remain in effect until further notice.

Authority for this closure is contained in Title 43, Subchapter F--Outdoor Recreation and Wildlife Management, 6010.3, 6010.4, and is consistent with the National Environmental Policy Act, Regulations as contained in 36 CFR 800, Executive Order 11593, and Executive Order 11644, as amended.

Effective date: These designations shall become effective upon publication.

Date

Gerald E. Hillier
District Manager, Riverside

United States Department of the Interior 6290 (370)

BUREAU OF LAND MANAGEMENT
WASHINGTON, D.C. 20240

July 15, 1977

Instruction Memorandum No. 77-361
Expires: 12/31/77

To: AFO's

From: Director

Subject: Amendments to Executive Order 11644, "Use of Off-Road Vehicles (ORV) on Public Lands

The following analysis and instructions pertain to the amendments to Executive Order (EO) 11644 issued by the President on May 24, 1977, and published in the Federal Register on May 25, 1977. The EO parts are given in the boxes below:

EXECUTIVE ORDER

OFF-ROAD VEHICLES ON PUBLIC LANDS

By virtue of the authority vested in me by the Constitution and statutes of the United States of America, and as President of the United States of America, in order to clarify agency authority to define zones of use by off-road vehicles on public lands, in furtherance of the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 et seq.), Executive Order No. 11644 of February 8, 1972, is hereby amended as follows:

AMERICAN REVOLUTION BICENTENNIAL 1776-1976

Section 1. Clause (B) of Section 2(3) of Executive Order No. 11644, setting forth an exclusion from the definition of off-road vehicles, is amended to read "(B) any fire, military, emergency or law enforcement vehicle when used for emergency purposes or law enforcement vehicle when used for emergency purposes, and any combat or combat support vehicle when used for national defense purposes, and".

Section 1. The Bureau cannot regulate the use of combat vehicles and their support in times of national defense emergencies. This language removes any doubt of this.

Sec. 2. Add the following new Section to Executive Order No. 11644:

"Sec. 9. Special Protection of the Public Lands. (a) Notwithstanding the provisions of Section 3 of this Order, the respective agency head shall, whenever he determines that the use of off-road vehicles will cause or is causing considerable adverse effects on the soil, vegetation, wildlife, wildlife habitat or cultural or historic resources of particular areas or trails of the public lands, immediately close such areas or trails to the type of off-road vehicle causing such effects, until such time as he determines that such adverse effects have been eliminated and that measures have been implemented to prevent future recurrence."

Section 2 establishes a new section 9 in EO 11644. Section 9 is in two parts: (a) and (b). Section 9(a) requires closure or restriction of an area despite any designation made under section 3 of EO 11644 when it is determined that ORV use <u>will</u> cause or <u>is</u> causing <u>considerable adverse effects</u>. However, there must be a clear showing, not merely suspicion, that the use of ORV's will, in fact, have a considerable adverse impact. When these conditions prevail, immediate closure or restriction <u>must</u> be made. Restrictions may be made for a specific type of vehicle causing the adverse effects. Under section 9(a), closure or restriction may be made without public participation, and the closure or restriction may be rescinded without public participation. This is generally in line with authority contained in 43 CFR 6010.4 at the present time.

In any case, ample public notice will be given of the action to be taken or the actual action taken, as is appropriate, and all feasible action should be taken to mitigate the adverse effects.

The key words in section 9(a) are "considerable adverse effects." While it is difficult to define this term precisely, it does not include ephemeral impacts of short duration and small area which do not effect endangered species, critical soils, or life cycles of flora and fauna. However, degredation in any degree of a significant cultural site shall be considered a "considerable adverse effect." For Bureau purposes, section 9(a) is a tool to be used to protect areas, when they need protecting, until they can be processed through the planning system and given a proper designation, and for emergencies such as fire, flooding, unusually deep snow (for wildlife protection), etc.

"(b) Each respective agency head is authorized to adopt the policy that portions of the public lands within his jurisdiction shall be closed to use by off-road vehicles except those areas or trails which are suitable and specifically designated as open to such use pursuant to Section 3 of this Order."

The Secretary has interpreted this to mean limited areas shall be closed. There have been no new criteria or guidelines given, and, we, therefore, interpret this to mean that the criteria contained in section 3 of EO 11644 would be applied, as well as certain provisions of the Federal Land Policy and Management Act, which would include fragile areas, areas of critical environmental concern, significant cultural areas, areas with endangered species, and other areas needing protection prior to designation.

These amendments to EO 11644 reinforce the direction and practices for protection that the Bureau has already taken and gives emphasis to the need to protect significant and critical areas. Until the ORV regulations are published incorporating these mandates, protective actions can and will continue to be taken under 43 CFR 6010.3, 6010.4, and 6250.0-6(b) and (c).

Enclosed for your information is a press release giving the Secretary's views on this matter.

George C. Turcott
Acting

1 Enclosure
Encl. 1 - Department of the Interior News Release

DEPARTMENT of the INTERIOR

OFFICE OF THE SECRETARY

news release

For Release May 26, 1977

INTERIOR SECRETARY SAYS OFF-ROAD VEHICLE USE WILL CONTINUE

Secretary of the Interior Cecil D. Andrus said today that the new Executive Order governing off-road vehicles on Federal lands will be applied to fragile areas which are actually threatened with serious damage.

"As we have said several times now, it does not amount to anything resembling a general ban against the use of off-road vehicles on Federal lands," he said, "and we have no intention of exceeding the scope of its limited intent."

He said much would depend on the voluntary actions of off-road vehicle users, who, he said, could prevent many problems by respect for land and its resources.

The Executive Order authorizes the heads of Federal land managing agencies to close off "particular areas or trails" where use of off-road vehicles "will cause or is causing considerable adverse effects on the soil, vegetation, wildlife, wildlife habitat or cultural or historic resources."

Andrus also noted the Executive Order's reference to "the type of off-road vehicle causing such effects," which clearly indicates that types of vehicles doing no harm will not be affected.

"Further, there is no new broad grant of authority to close off large blocks of land," the Secretary said. "The agency head can close off 'portions' of the lands his agency manages, and we interpret that to mean limited areas."

The Interior Department, he said, will continue to protect the resources of the lands it manages, using its authority at times and places where it becomes clearly necessary.

Some 80,000 concerned citizens have written to the White House and the Interior Department this spring expressing concern that the new Executive Order would result in a general ban against off-road vehicle use on Federal lands.

The Secretary urged off-road vehicle user organizations to spread the word about the actual language and intent of the order. He also expressed hope that user groups and the industries producing off-road vehicles would take part in public discussions leading to planning the uses of Federal lands, educate their members about the issues, develop and enforce good codes of conduct, and cooperate with Federal land managers on the ground.

"These are everyone's lands, and their public values must survive to be used and enjoyed by future generations," he said.

Andrus added that he will continue to oppose the idea of the Department adopting a system of individual vehicle permits for off-road use on public domain lands. Group permits will be required for special events as in the past, he said.

x x x

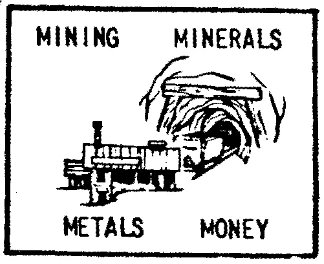
INT: 3586-77

Encl. 1

RAND DISTRICT NEWS and MINER

A LEGAL NEWSPAPER FOR RANDSBURG, JOHANNESBURG, AND GARLOCK

VOL.7,NO.11 JOHANNESBURG, CALIF THURSDAY, FEBRUARY 9, 1978 10 cents



Magazine Predicts Rise in Gold Price in 1978

There is an excellent chance, says Time magazine for February 6, that during 1978 the price for gold will surpass the record $197.50 per ounce achieved in 1974.

Late last month, the price reached $176.63 in Zurich, having steadily risen on the world's money markets from $103 in August, 1976.

BLM Closes Squaw Spring to Vehicle Traffic

(The following notice was published in the Federal Register for January 4, 1978. The notice, originating with Gerald E. Hillier, manager of Bureau of Land Management Riverside district office, states that the unimproved access road to Squaw Spring is closed to vehicle

Continued on page 6

Micahel MacRae, Mike Sullivan, and Perry Lang, stars of movie "The Great Ride", some segments of which were shot earlier this month in Randsburg and Red Rock canyon.

News and Miner photo.

ROAMING ROUND RAND: Johannesburg post office and grocery store. Nell Deese, wife of proprietor, Tony Deese, and Marge Warner, clerk in the store, enjoy a warm February morning. News and Miner photo.

Senior Citizens Advised to Elect Own Officers

Following the senior citizens luncheon on January 27, Charlotte Hogan, site manager, called a meeting and advised the senior citizens that they should elect their own officers and determine the manner in which they wished to spend their funds and what entertainment they wished to have after their lunches. Web Twitchell was elected to chair a meeting in the near future, when these items were to be considered.

Charlotte Hogan and Helen Howard, a senior citizen council member, reported on their trip on January 26 to Kern County Economic Opportunity Corporation in Bakersfield, where they discussed problems pertaining to the senior citizens program.

Happy St. Valentine's Day

Chimbole's Representative Will Speak at TRIO Meeting

Gene Saint-Amand of Ridgecrest, field representative for Assemblyman Chimbole, will attend The Rand Improvement Organization meeting on Thursday, February 9, at 7:30 p.m., according to Ray Webster-Zieber, president. Mr. Saint-Amand will ask TRIO what it would like to have in regard to state assistance in the Rand area. He will also discuss TRIO's recent letter to him concerning some suggested changes in the new Randsburg turnoff from highway 395. Also to be discussed, said President Webster-Zieber, are the final arrangement for TRIO's incorporation papers.

Sandy Poulin of Tri-County Ambulance will be present and speak on the service

(Continued on page 4)

Randsburg Is Locale for Movie

Two young men accept a challenge to ride their motorcycles, totally off road, from the Mexican border to Canada. They are chased by the "bad guy", but don't know why until the end of their trip.

This is the story of the movie which is being "shot" in Randsburg and Red Rock canyon last week by Outdoor Productions. The feature-length action film for the

(Continued on page 6)

Randsburg Couple's Home Spared in Accident

A Volkswagen camper, belonging to John and Esther Neagle of Randsburg, was "totalled" on the night of January 28, when struck from behind by another automobile. The Neagles' vehicle, parked at the time of the accident in front of their residence on Butte ave., was

Continued on page 6

Squaw Spring continued

use. Squaw Spring is on the east slope of Red Mountain, about five miles from the Trona turn-off road at highway 395. About 75 years ago, the Squaw Spring well was a source of water for the Rand district. Pumped up the side of the mountain to a reservoir in the saddle, the water then flowed by gravity to Rand mines and to domestic users.)

'The California Desert Vehicle program (BLM's Interim Critical Management program for vehicle use on the California Desert), restricts area No. 14 (Red Mountain/Cuddeback), to Existing Vehicle Routes.

"The unimproved access route into Squaw Spring, in area No. 14, is now designated as closed to vehicle use beginning at a point approximately 200 feet north of Squaw Spring wildlife guzzler, A-91, to the end of the road, a total distance of approximately 0.7 miles. Foot travel and loitering within the immediate area of the guzzler will be restricted to a maximum of 30 minutes. Camping within the closed area is prohibited.

"This closure is situated near the town of Red Mountain, Calif., in the Mojave Desert at the following location: San Bernardino Base and Meridian, California. T.29S, R.41E., Sec. 34, SW1/4SW1/4NE1/4N1/2 SE1/4.

"The purpose of the road closure is to protect cultural and wildlife values associated with Squaw Spring from unnecessary damage. This closure will provide for better resource management and will allow for the programmed implementation of the Squaw Spring Activity Plan.

"The area contains unique cultural values that are candidates for the National Register of Historic Places (89 Stat. Pub. L. 89-665). These warrant special protection from inordinate damage which will destroy the integrity of the site complex. Damage is presently taking place. Additional damage to the sites will significantly reduce their scientific value.

"The wildlife guzzler, A-91, represents a critical water source for small birds and some large mammals. The primary species of concern are the Mourning Dove, Gambel's Quail, Chukar, deer, and Desert Bighorn Sheep. This guzzler is the only reliable wildlife water source for an area in excess of 100 square miles.

"The closed designation will be effective immediately and remain in effect until further notice.

"Authority for this closure is contained in Title 43, Subchapter F--Outdoor Recreation and Wildlife Management, 6010.3, 6010.4, and is consistent with the National Environmental Policy Act, regulations as contained in 36 CFR 800, Executive Order 11593, and Executive Order 11644, as amended."

******

Wyman continued

fices in Tehachapi prior to becoming a legislative candidate in 1976. He is currently actively involved in the management of his family's Antelope Canyon Ranch and recreational complex in Tehachapi. In that capacity, he serves as president of one corporation and vice president of another. During the past year, he worked full time as executive vice president and general manager of the Antelope Valley Board of Trade, resigning that position on December 1, 1977, to prepare for his upcoming Assembly race.

Wyman is 33 years old. He and his wife, the former Lynn Larson of Hesperia, are expecting their first child in May.

"I expect this to be another close, hard fought race and this time, I expect to win," Wyman predicted. "I plan to campaign vigorously on the issues in every community in this big 32,000 square-mile district."

He attributed his strong 1976 showing to an effective grass-roots organization of volunteer workers and said that those workers were ready to campaign again.

"We've been especially encouraged by the example of two of the desert area's most popular and effective office holders, State Senator Newt Russell and the late Congressman Jerry Pettis," he noted. "They both lost in their first run for public office but came back to win the second time and went on to serve with distinction. I'm looking forward to following in their footsteps."

Arizona Collectors Will Hold Spring Show

Arizona Barbwire Collectors Association will hold its antique barbed wire and collectable spring show on May 20-21 at Valley West Mall, Glendale, Arizona. Reservations for display tables may be made through Wayne Cundiff, 8636 N. 15th Dr., Phoenix, Arizona, 85021.

Movie continued.

theater, directed by Do Huelette, stars Michael Mac Rae, the "bad guy", Perr Lang, and Michael Sullivar The latter two have appeare in the television serie "Police Woman" and "Th Waltons".

Randsburg is often the lo cale for movies. Some seg ments of "Bannecek", star ring George Peppard, and o "Cannon", starring William Conrad, were made there a few years ago.

Accident continued

pushed for several feet up into the yard, tearing down the yard fence and up-rooting a china-berry tree. Both vehicles stopped short of the front room of the house, where the Neagles were sleeping at the time.

The other vehicle was badly damaged. The driver, a young man of Ridgecrest, was uninjured, according to a report.

Ketchum continued

we'd have come close to a budgetery balance this year. Let's carry that a step further. The administration estimates that 1979 receipts will total $440 billion. If we were to keep our spending at last year's level, we'd have a budget surplus of about $38 billion. Instead, however, the popular deficit spending trend will continue: our budget tops $500 billion for the first time."

Ketchum, who has introduced a Constitutional amendment which demands a balanced federal budget, disagrees that large portions of the budget are uncontrollable. "Instead, it's those doing the spending who are 'uncontrollable', he said. "Sooner or later we're going to have to face the facts. Continuing to spend money we do not have will not help the economy or balance the budget. It will simply perpetuate the already intolerable burden of inflation upon our citizens," Ketchum concluded.

[4310-84]

Bureau of Land Management

CALIFORNIA

ORV Designation for Randsburg/Johannesburg (Squaw Spring)

The California Desert Vehicle program (BLM's Interim Critical Management program for vehicle use on the California Desert), restricts area No. 14 (Red Mountain/Cuddeback), to Existing Vehicle Routes.

The unimproved access route into Squaw Spring, in area No. 14, is now designated at closed to vehicle use beginning at a point approximately 200 [illegible]rth of Squaw Spring wildlife [illegible], A-91, to the end of the road, a total distance of approximately 0.7 miles. Foot travel and loitering within the immediate area of the wildlife guzzler will be restricted to a maximum of 30 minutes. Camping within the closed area is prohibited.

This closure is situated near the town of Red Mountain, Calif., in the Mojave Desert at the following location:

SAN BERNARDINO BASE AND MERIDIAN, CALIFORNIA

T. 29 S., R. 41 E.,
Sec. 34, SW¼SW¼NE¼, N½SE¼.

The purpose of the road closure is to protect cultural and wildlife values associated with Squaw Spring from unnecessary damage. This closure will provide for better resource management and will allow for the programed implementation of the Squaw Spring Activity Plan.

The area contains unique cultural values that are candidates for the National Register of Historic Places (80 Stat. Pub. L. 89-665). These warrant special protection from inordinate damage which will destroy the integrity of the site complex. Damage is presently taking place. Additional damage to the sites will significantly reduce their scientific value.

The wildlife guzzler, A-91, represents a critical water source for small birds and some large mammals. The primary species of concern are the Mourning Dove, Gambel's Quail, Chukar, deer, and Desert Bighorn Sheep. This guzzler is the only reliable wildlife water source for an area in excess of 100 square miles.

The closed designation will be effective immediately and remain in effect until further notice.

Authority for this closure is contained in Title 43, Subchapter F—Outdoor Recreation and Wildlife Management, 6010.3, 6010.4, and is consistent with the National Environmental Policy Act, regulations as contained in 36 CFR 800, Executive Order 11593, and Executive Order 11644, as amended.

Effective date: January 4, 1978.

Dated: December 7, 1977.

GERALD E. HILLIER,
District Manager, Riverside.

[FR Doc. 78-4 Filed 1-3-78; 8:45 am]

[4310-84]

CALIFORNIA

ORV Designation for Randsburg/Johannesburg (Squaw Spring); Correction

In FR Doc. 78-4, appearing at page 799 in the FEDERAL REGISTER of Wednesday, January 4, 1978, paragraph 2 is corrected in the fifth line of that paragraph by deleting "San Bernardino Base and Meridian, California," and adding Mount Diablo Base and Meridian, California.

Dated: January 26, 1978.

GERALD E. HILLIER,
District Manager, Riverside.

[FR Doc. 78-2855 Filed 2-1-78; 8:45 am]

Appendix L

Closure Explanation Sign

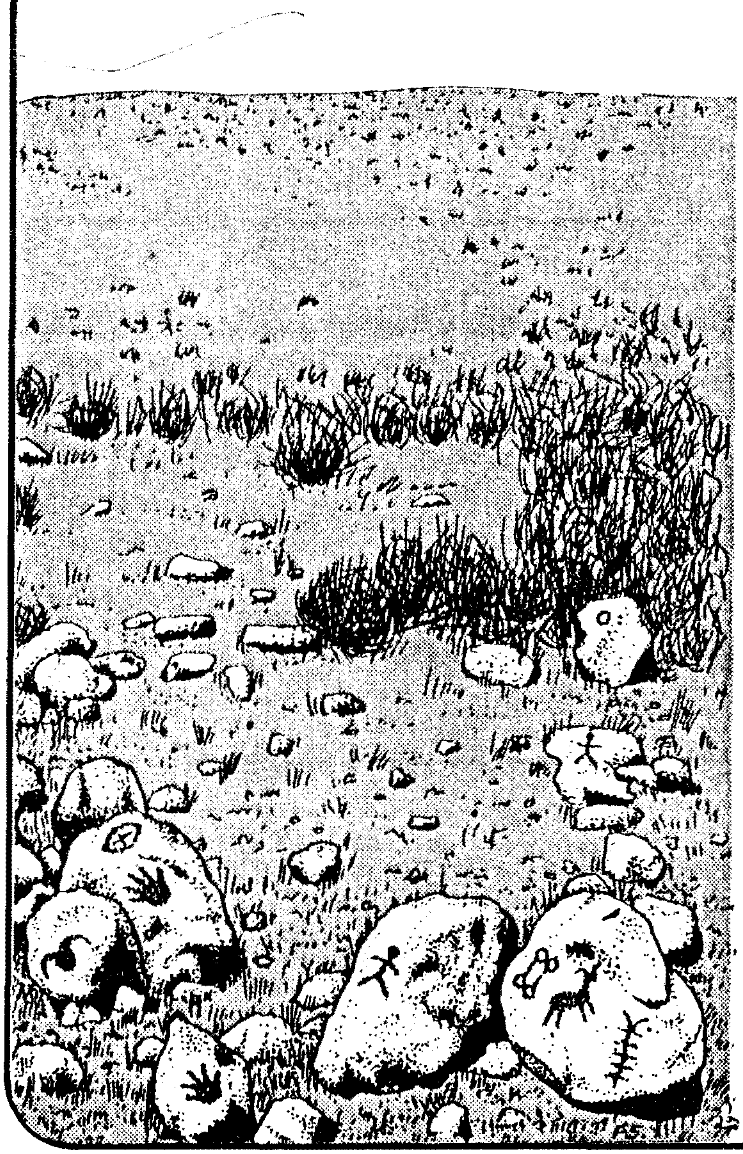
Squaw Spring Archaeological District

In order to protect historic and archaeological resources, vehicular access is restricted in this area.

If vehicular access is required, please contact the patrolling ranger or the Barstow Way Station, 831 Barstow Rd., Barstow, CA 92311.

Appendix M

Cultural Resources Sign



SQUAW SPRING ARCHAEOLOGICAL DISTRICT

Hundreds of years ago, people pursued a hunting and gathering way of life in this area. The archaeological remains and their distribution on the surface of the ground reflect the daily activities of these people and their utilization of the environmental resources.

Please do not disturb or remove any of the archaeological remains. Archaeologists are in the process of studying and recording the distribution of archaeological remains in the California desert. These studies reveal much about past human behavior.

For more information please contact the patroling BLM ranger or visit the Barstow BLM Way Station, 831 Barstow Rd., Barstow, CA 92311, or the Ridgecrest BLM Area Office, Ridgecrest, CA.

Archaeological remains are protected by the Federal Antiquities Act and the 1979 Archaeological Resource Protection Act.

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MARCH 3, 1849

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BUREAU OF LAND MANAGEMENT

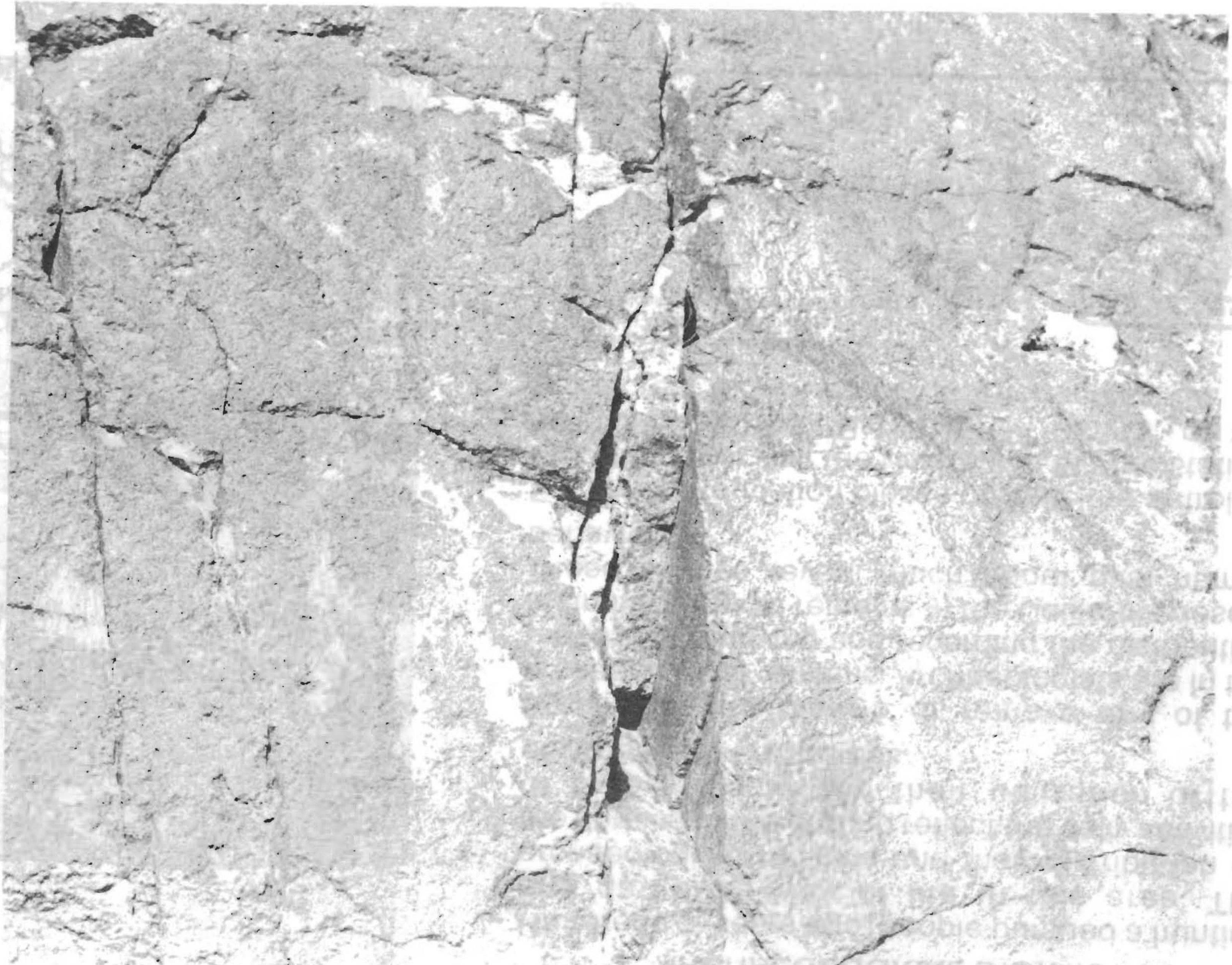

Photo 7. Petroglyphs at SBr 2612, near Squaw Spring Guzzler.