RESULTS OF A PHASE I/CLASS II CULTURAL RESOURCES SURVEY FOR THE PROPOSED BAXTER QUARRY EXPANSION IN THE CAVE MOUNTAIN AREA OF THE MOJAVE DESERT, SAN BERNARDINO CO., CALIFORNIA

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MANAGEMENT SUMMARY

McKenna et al. initiated the cultural resources investigations for the expansion of the Cal-Portland operations at the Baxter Quarry in the Cave Mountain area of San Bernardino County, California, at the request of Lilburn Corporation, representing the California Portland Company. The project involves the expansion of current quarrying activities into surrounding acreage. The project area consists of approximately 280 acres of land east and south of the existing quarry and the recent field survey consisted of approximately 220 acres. The 60 acres were not surveyed because they involved steep slopes in areas deemed too dangerous to access.

The project was initiated in late June of 2019 and completed in October of 2019. The field work was completed in July of 2019 and involved two surveyors working over the course of and six field days. During the survey, a single isolated jasper flake was identified on the southern side of Cave Mountain (recovered) and the remainder of the resources identified were associated with the historic mining activities and/or modern recreational use of the area. Overall, McKenna et al. concluded the entire project area is one, large historic site associated with a previously recorded site located at the Baxter Siding of the Union Pacific Railroad alignment (P-36-03533H). McKenna et al. recorded the resources a part of this previously recorded site and completed the updated DPR-523 forms documenting the findings and conclusions.

Summarized here, McKenna et al. determined the modern recreational features (primarily hearths located near the various dirt access roads) are of no historical significance and require no additional investigations. The identified mining claim markers (cairns, stakes, pipes, incised concrete blocks, etc.) were documented by UTM coordinates (NAD 27). Some of these markers or relatively recent (1970s and 1980s), while others are indicative of older points (primarily marked by cairns). Only one permanent mineral survey marker was located. This marker should be avoid and left undisturbed.

With the exception of a sparse scatter of glass fragments (primarily modern) and some nails, the only potentially significant resources within the quarry are three concrete foundations representing the 1925-1926 limestone kiln and hydrated pant established by the sugar beet consortium (they were leasing the quarry for limestone). Also associated with this area are the berms associated with the historic railroad spurs, rock retaining walls, loading platforms, and access roads. McKenna et al. documented these features and concluded they lacked integrity and any potential to yield addition data pertinent to understanding the historic use of this area. The project area was historically always a mining site. The remnants confirmed this use, but the area has been systematically stripped of

the early equipment and other areas have been buried by mine tailings. McKenna et al. concluded the resources within the project area are not significant and no further studies are warranted.

It is noted, however, the area is still considered moderately sensitive for the presence of additional evidence of prehistoric use, despite the limited evidence identified during this study. Prehistoric resources have been identified within one mile of the project area and the alluvial fan bounding Cave Mountain has the potential to be associated with buried resources.

McKenna et al. is recommending the project area be considered clear of cultural resources at this time, but during site preparation for the quarry expansion (e.g. grading roads, minor or shallow excavations in relatively undisturbed areas, or establishment of work area) be subjected to archaeological monitoring and periodic spot monitoring. The extent of this monitoring would be at the discretion of the Lead Agency and in consultation with the consulting archaeological representative.

The project area is not sensitive for paleontological resources and, therefore, McKenna et al. is not recommending any further investigations with respect to paleontological resources.

Any questions regarding this document should be directed to McKenna et al.

Jeanette A. McKenna

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October 19, 2019

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by,

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INTRODUCTION

A Phase I/Class III cultural resources investigation for the proposed expansion of the existing Baxter Quarry operations in the Cave Mountain area of the Mojave Desert, San Bernardino County, California, was initiated by McKenna et al. (Appendix A) at the request of Lilburn Corporation, San Bernardino, California. The existing quarrying operations have been on-going for decades, with the earliest recorded activities predating 1904. The current investigations were undertaken to insure compliance with updated laws, policies, and guidelines pertaining to the protection of non-renewable cultural resources and to avoid unnecessary and avoidable adverse impacts to potentially significant cultural resources within the areas of direct and indirect impacts.

This study was undertaken in compliance with the California Environmental Quality Act (CEQA), as amended, and also fulfills compliance with Section 106, as defined by 36 CFR 800 (implementation of the National Historic Preservation Act, as amended). Specifically, these processes are designed to provide the data necessary to satisfy the legal requirements for environmental documentation and the assessment of adverse impacts. This study also complies with the policies and guidelines of San Bernardino County.

LOCATION AND ENVIRONMENTAL SETTING

The project area is located in the Mojave Valley; south of I-15 and east of the small community of Afton. The property is accessed via I-15 and Basin Road; approximately 50 miles east of Barstow (Figure 1). The Cave Mountain/Baxter Quarry dominates the area of Township 11 North, Range 6 East; Sections 12 and 13. A small portion of the quarry extends into Township 11 North, Range 7 East, Section 7 (Figure 2). This property is just north of the Mojave River and the alignment of the Union Pacific Railroad. It is also north of an existing dike paralleling the Mojave River.

Figure 1. General Location of the Project Area.

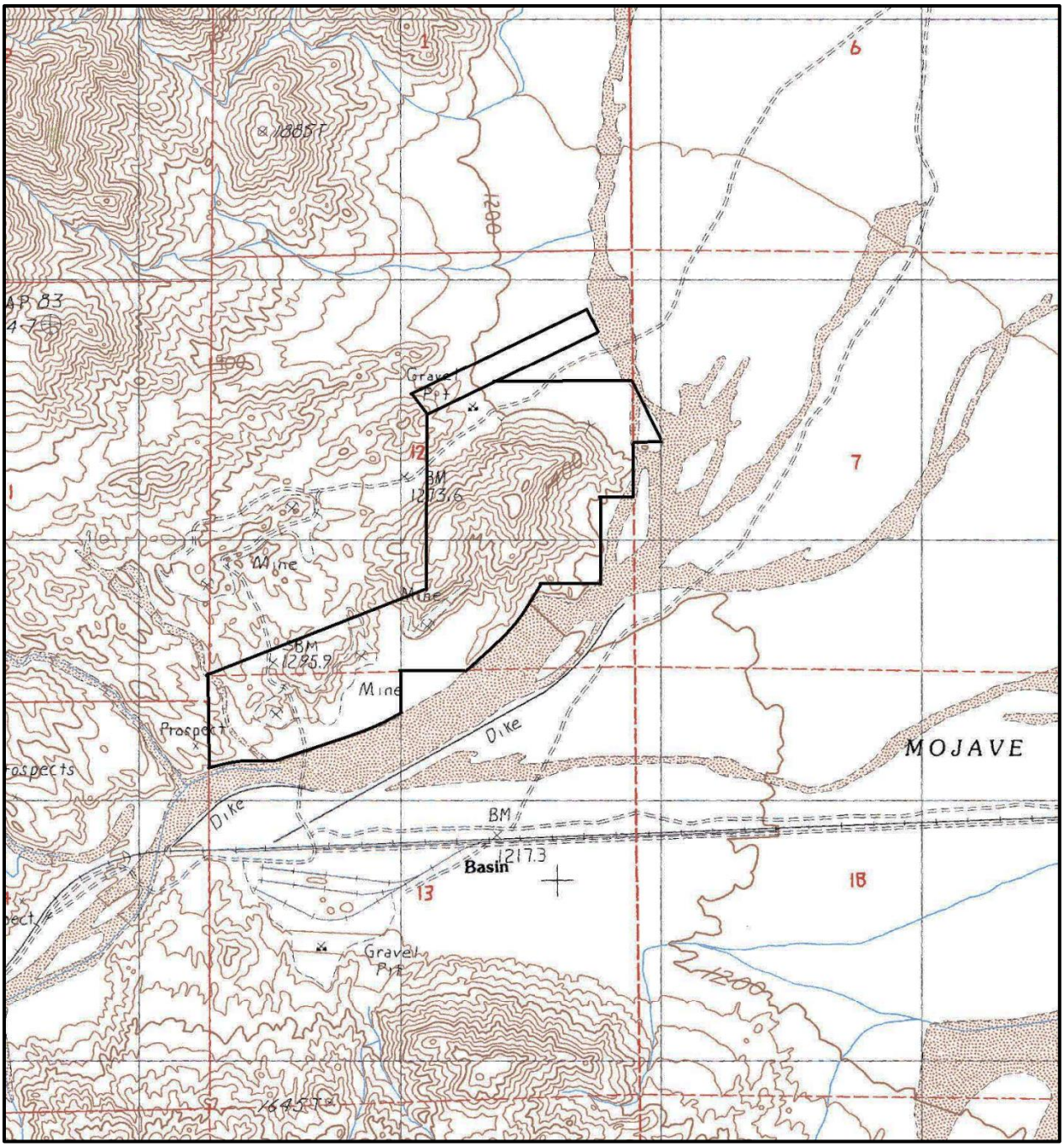

Figure 2. Specific Location of the Project Area (USGS Cave Mountain Quadrangle).

The current project involves approximately 280 acres of land identified as consisting of a number of individual claims (Table 1; 264.5 acres) and a railroad spur right-of-way (15+/- acres; Figure 3). The entire project area is privately owned and under the jurisdiction of the County of San Bernardino (Lead Agency). Neither the Bureau of Land Management nor the Army Corps of Engineers is involved, but may request review of documentation.

Table 1. Assessor Parcels Identified within the Project Area.			
APN	Claim	Acreage	Misc. Reference
0843-36-02	Monarch Mine	17.45	M.S. No. 4240
0843-36-03	Emperor Mine	20.66	M.S. No. 4241
0843-36-09	Calcium Mine	18.44	M.S. No. 4604
0843-36-10	East End Mine	15.95	M.S. No. 4604
0843-36-11	p/o White Marble No. 3	9.18	Pacific Marble
0843-36-12	p/o White Marble No. 3	10.00	Pacific Marble
0843-36-13	p/o White Marble No. 2	18.18	Pacific Marble
0843-36-16	p/o White Marble No. 1	7.79	Pacific Marble
0843-36-17	p/o RR Spur R-O-W	1.96	within Rock Wren
0843-36-18	p/o White Marble No. 1	24.25	Pacific Marble
0843-36-19	p/o White Marble No. 2	9.23	Pacific Marble
0843-36-20	p/o White Marble No. 2	10.00	Pacific Marble
0843-36-21	p/o White Marble No. 2-	12.00+/-	Pacific Marble
0843-36-22	Evening Star Mine	10.00	Pacific Marble
0843-36-24	Rock Wren Nos. 1 and 2	40.00+/-	Placer Mine
0843-36-26	p/o RR Spur R-O-W	4.6	within Rock Wren
0843-36-27	p/o RR Spur R-O-W	p/o 14.1	within Rock Wren
0843-36-35	Lillian Belle No. 2	20.66	CalPortland
0843-36-36	Lillian Belle No. 3	20.66	CalPortland

In this particular portion of the Mojave Desert is located north of the Mojave River and in the eastern extent of the Cave Mountains. The Cave Mountains are located between the Mojave River (south) and I-15 (north); east of the community of Afton and west of Zzyzx. The project area is on the southeastern side of Cave Mountain and south of Cronise Valley. As previously noted, the specific project area is within Township 11 North, Range 6 East, Sections 12 and 13. Elevations within the project area range from approximately 1200 to 1400 feet AMSL and a number of shallow drainages are located east of Cave Mountain, originally designed to drain directly into the Mojave River, but diverted by the dike to enter the rive southwest of the project area. McCorkle-Apple and Lilburn (1992:1) characterize the natural environment of the Mojave Desert:

> ... broad alluvial basins flanked by north to northwest trending mountain ranges. Formed by late Tertiary and Quaternary extensional faulting, these mountains are comprised of crystalline rocks of pre-Tertiary age; sedimentary and volcanic rocks of Tertiary age; and sediments and local basalt flows of Quaternary age (Dibblee 1967). Most of these mountain ranges are separated by basins or valleys that lack external drainages resulting in the formation of dry lakes or playas. Seasonal precipitation drains toward the alluvial basins, but is usually absorbed into the ground prior to reaching them ... (Wright and Frey 1965:289).

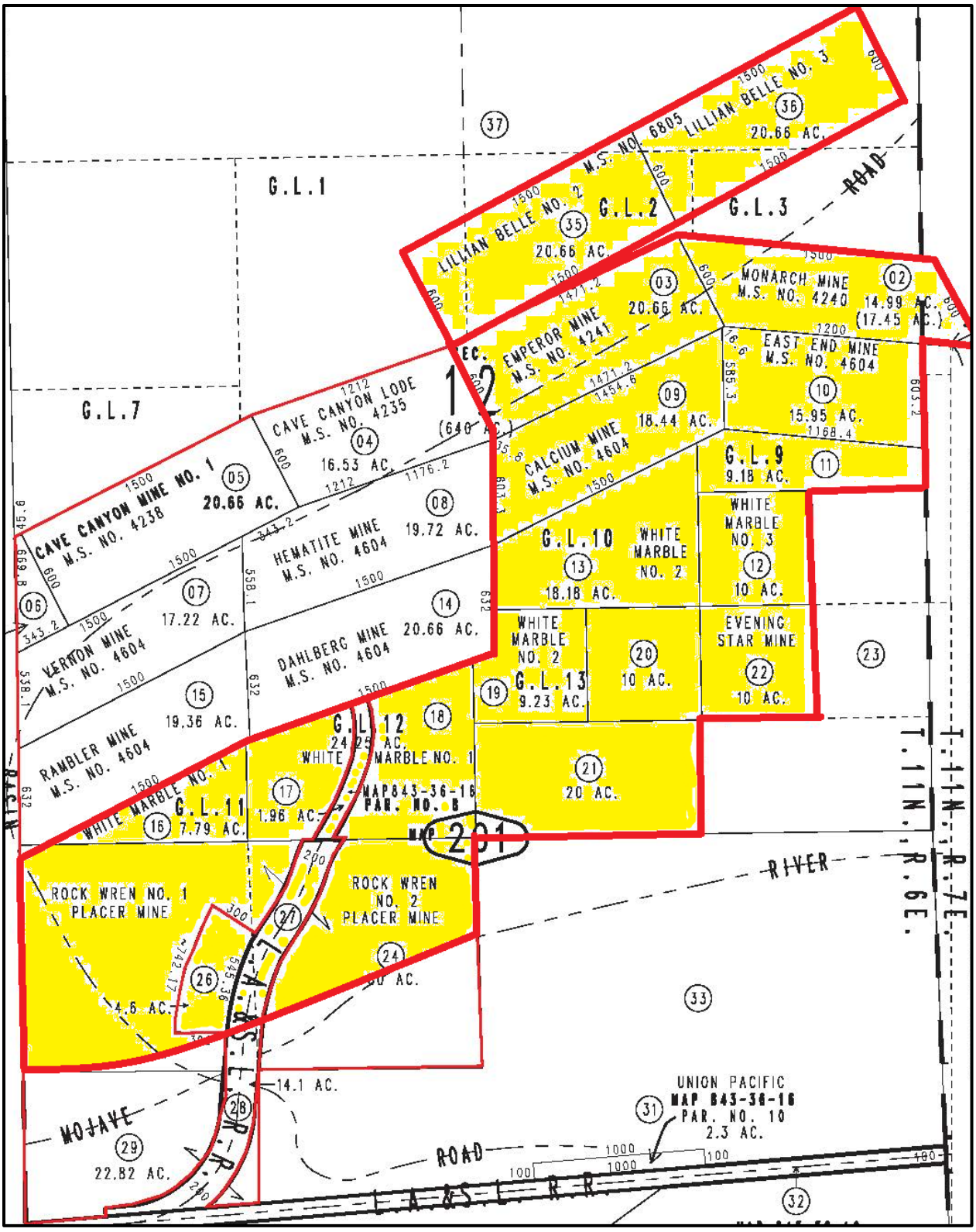

Figure 3. Parcel Map Illustrating the Project Area Boundaries.

> ... The Mojave River which flows northeasterly, originates in the San Bernardino mountains and terminates at the Soda and Silver Lake playas and/or East Cronise Playa. The Mojave River flows underground through much of its course except during periods of heavy runoff which result in the formation of shallow lakes. Troy Lake, a small remnant of Pleistocene Lake Manic, is located approximately 27 miles east of Barstow. This playa, which is normally dry, produces surface water only after periods heavy rainfall (Neal 1975; Motts 1970) ... Surface water in the form of an artesian spring can be found near the town of Newberry. This spring is thought to be of alluvial artesian origin, related to tectonic activity centered around the base of Kane Mountain (Waring 1915). In recent Historic times, due to use by the Santa Fe Railroad and well-drilling, the water table in the Mojave River has dropped and dried up the surface water at Newberry Springs ... (Davis and Smith 1981).
>
> The Mojave Desert region is geologically a great wedge-shaped fault block. It is bounded by the San Andreas and Garlock fault zones on the southwest and north, respectively, but has no definite natural eastern limits. Mountain ranges separate the Mojave Desert from the coastal area (to the southwest), and from the Basin and Range province located to the north. The desert itself is characterized by north-south trending mountain ranges which enclose expanses of arid valleys and low-lying basins or sinks (Harry 1992). The western Mojave Desert represents a series of depressed blocks between rock masses which have been uplifted along major vertical faults. Buttes and ridges within the valley basins result either from erosion processes (mountain remnants), or from uplifting and volcanism (Stones 1964: 88). The valley floors are com-posed primarily of Pleistocene alluvium containing gravel, sand and silt. Lithic resources are restricted to the buttes and ridges which rise above the unconsolidated alluvium. Because few systematic archaeological surveys have been conducted in the area, it is unknown how widespread are lithic materials suitable for prehistoric tool production (Harry 1992).

Norris and Webb (1990:227-244) describe the … area as being associated with the Mesozoic rocks. Specifically, they state:

> Mesozoic. Mesozoic bedded rocks have been recognized at a number of places in the Mojave, but the best examples occur in the eastern ranges where they have escaped severe metamorphism. Examples can be seen in the Soda, Old Dad B, Mescal Range, Providence, Cave, and Cow Hole Mountains. In the Barstow area, equivalent rocks, more strongly metamorphoses, are present in the Roman and Sidewinder ranges.

> Two rock units, best known from the Colorado Plateau to the east, are representative of the group of rocks. The marine, early Triassic Moenkopi is present in the Providence Mountains and the Jurassic nonmarine Aztec sandstone has been mapped in the Old Dad B., Soda, Cow Hole, and Mescal mountains ...
>
> Most Kelso dune sand is composed of quartz and feldspar, like dune sand in many places. The Kelso dunes also contain an appreciable quantity of dark heavy minerals often concentrated by the window into streaks and patches. The dark minerals are mostly magnetite, probably derived from the iron ores of Cave Mountain in Afton Canyon. Minor amounts of such minerals as zircon, ilmenite, monazite, rutile, garnet, and cassiterite are also present. In recent years, the presence of these heavy minerals have promoted efforts to mine the sand, but as yet no successful production has occurred.

The climate of the Mojave Desert is described as “subarid”, transitional between the relatively colder climate of the nearby Great Basin and the subtropical climate of the Sonoran Desert (McCorkle-Apple and Lilburn 1992:2; Axelrod 1979). Seasonal temperatures vary, as do levels of rain, general humidity, and wind. Temperatures can range from below 60^{o} Fahrenheit to over 100^{o} Fahrenheit. With respect to surrounding desert regions, the Mojave Desert receives “... below average annual precipitation ...” (Bailey 1975). This resulted from the mountain ranges located to the west of the desert, that block the flow of moist air from the Pacific Ocean. The sparse precipitation and high temperatures create a situation where evaporation exceeds precipitation, particularly in those areas lying below 5,000 feet above mean sea level (AMSL) in elevation (Warren and Crabtree 1986: 183). Reliable water sources in the Mojave Desert are currently available only along major rivers, intermittent streams and springs, and seasonal claypans. Three main river systems flow into the Mojave Desert: the Mojave River, the Amargosa River, and the Owens River. During the Pleistocene and early Holocene these rivers formed lakes where the present-day sinks are located (Harry 1992).

During the Pleistocene, or “Ice Age”, between 2 million and 10 thousand years before present (B.P.), the Mojave Desert was considerably cooler and wetter. In that epoch, the Mojave River flowed through the same area as identified today, but has been described as a perennial water source feeding and flowing into and out of several of the area’s lakes. Of these, Lake Manix reportedly spanned today’s Troy and Coyote Lakes (now both dry), as well as the western portion of Afton Canyon. The current study area lies near the boundary of the western bank of this Lake Manix and the Mojave River. Between 18,000 and 15,500 B.P., the Manix fault opened a rift that drained Manix Lake, cutting Afton Canyon, and filling Lake Mojave which comprises the current Soda and Silver Lakes (both dry; see Walker 1986).

These water sources provided a base for an ecosystem consisting of many now-extinct species of flora and fauna. The Pleistocene marshes provided the most extensive habitat

including cane, cattails and bulrushes. Other species of flora remained viable at the higher elevations, but were doomed at lower ones. These included piñon pines, junipers, oaks, and various grasses. Extinct mammals include two species of ground sloth, camels, llama, horses, mammoth, large bison, dire wolf and saber tooth tiger. Other species no longer found within the Mojave include storks, cranes, flamingos, and a variety of fresh water clams and other fish in the formerly perennial lakes and rivers. Migrating birds no longer found in the desert include coots, teals, geese, grebes, whistling swans, and four species of duck (Walker 1986).

During the early Holocene (10,500 to 8,000 B.P.), climatic fluctuations have been recorded and there was a warming and drying trend characterized by the disappearance of lakes and a reduction in the number of springs. The climate became wetter in the middle Holocene (ca. 5,100 B.P.) and warmer and drier again after 2,000 B.P. Citing Weide (1982), the last 2,000 years have been characterized by considerable "climatic oscillations" ranging from extreme droughts and massive flooding.

The effects of changing paleoclimatic conditions on the hydrological, floral and faunal patterns of the western Mojave Desert are only partially understood. As with lakes elsewhere in the Great Basin, the large playas of the western valleys undoubtedly provided year-round sources of water during the wettest periods. Unresolved, however, are the levels to which the lakes filled, the time periods during which the lakes were perennial, and the effects that the climatic changes had on floral and faunal patterns (Harry 1992). The flora and fauna of the Mojave Desert have adjusted to the extreme conditions of temperature and sparse fresh water sources.

Flora is dominated by the presence of creosote bush scrub *(Larrea divaricata*) and salt bush (*Atriplex confertifolia*). Citing Barbour and Major (1977), creosote is drought-tolerant and salt bush is often found near dry playas. Blackbrush (*Coleogyne ramosissima*) and various species of cacti are also common. The greater Mojave Desert is covered sparsely by various shrubs, among which creosote bush (*larrea tridentata*) and Mojave sage (*salvia mohavensis*) predominate.

About one quarter of the Mojave's plants species are endemic. The most commonly known of these is the spiny-armed Joshua tree (*yucca brevifolia*), whose boundaries define the areal limits of the ecosystem. Riparian environments, though rare, provide an important water source for oases of biotic communities, as well as a foundation for more widely ranging ones (www.blm.gov/education).

The Mojave, Amargosa, and Colorado River environments represent the desert's main riparian systems, and have all been heavily impacted by non-native species as well as water diversion for human use. The current study area is located on the north bank of the Mojave River, at which point the typical native creosote and sage remain predominant. These tend to be denser along higher terraces where there is an intermittent water source. Along the riverbed, alluvial sands and silt preclude the presence of much vegetation. Some cottonwoods (*Populus fremontii*) are present in the greater riparian community, but not within the specific project area. Also present on the lower river terrace are saltbush

(*Atriplex canescens*), Mormon tea (*Ephedra californica*), Indian Rice Grass (*Orozpsis hymenoides*), tumbleweed (*Salsola kali*) and mesquite (*Prospis juliflora*) (Leonard 1980).

The Mojave River channel, in areas associated with springs and/or ephemeral drain-ages, is also characterized as a riparian biotic community (see McCorkle-Apple and Lilburn 1992:2-5), exhibiting mesquite (*Prosopis glandulosa*), tamarisk (*Tamarix pentandra*), desert willow (*Chilopsis linearis*) and some marsh plants. Near Newberry Springs, there is evidence of screwbean (*Prosopis pubescens*), cat claw (*Acacia greggii*), slender willow (*Salix exigna*) and common reed (*Phragmites australis*) (Davis and Smith 1981; McCorkle and Lilburn 1992:5).

The diverse plant community gives rise to a variety of fauna. The greater Mojave is home to bighorn sheep (*Ovis canadensis*) at the higher elevations, and *coyote (Canis latrans*) are common throughout the region. Other mammals include the ubiquitous non-native burro (*Equus asinus*), several species of rabbits, and a large variety of rodents. Snakes present include the Rosy Boa (*Lichanura trivirgata*), Red Racer (*Coluber constrictor*), Gopher snake (*Pituophis melanoleucus*), the Mojave Green (*Crotalus scutulatus*), and the Desert Sidewinder (*Crotalus cerastes*) rattlesnakes. Other reptiles include desert tortoise (*gopherus agassizzi*) and many species of lizard.

Avifauna include the LeConte thrasher (*Toxostoma lecontei*), sage thrasher (*Oreos-coptes montanus*), cactus wren (*Heleodytes brunneicapillus*), raven (Corvus corax), red-tailed hawk (*Buteo jamaicensi*) turkey vulture (*Cathartes aura*), various ducks (*Anas*), and the American coot (*Fulica americana*).

At higher elevations (over 3900 feet above mean sea level), the black bush community, which includes yuccas and agaves, replaces the creosote bush community (Vasek and Barbour 1977:854). These plants provide a seasonal food source and other, non-edible resources as well. At still higher elevations, the piñon-juniper community replaces the black bush community. Piñon nuts, found only in the higher mountain ranges of the eastern and northern Mojave, were an important component of the aboriginal diet. A significant feature of the Mojave Desert is that not only are different biotic communities juxtaposed against one another, but plants in higher elevations tend to mature later in the summer than plants in lower elevations, providing different resources at various times of the year (Altschul 1991; Altschul et al. 1985 and 1989; Warren 1984:343).

In the area of the Baxter Quarry and Cave Mountain, Hatheway and Duffield (1989:4) state:

> Crossing the bajada below the mine sites, a broad flood channel emanating from Afton Canyon extends in a generally southwest to northeast direction. On regional maps this area is considered to be a part of the Sink of the Mojave. In times of flood, which have occurred repeatedly throughout historic times, the closest water source would have been in this Sink of the Mojave, somewhat less than a mile to [the] south of the property. Under normal conditions, however, the Mojave runs under a layer of sand at this

> location, making the closest reliable source of water several miles to the west in Afton Canyon. There are no extant or historically recorded springs, seeps, or tanks on the property. Finally, a wash channel crosses the eastern portion of the subject property. The solid in and near the wash is coarse sand topped by fist-sized metavolcanics and water-worn granitic cobbles.

Citing Crull (2008; also see Dames and Moore 1985), who completed a study due south of the current project area, the topography and geology of the area is described:

> The area is comprised of hilly terrain, south of Cave Mountain and with the greater Mojave Wash area, west of the Mojave Recreational Area. The area has several mining prospects, with mining equipment still in place. The APE is just south and west of the current Union Pacific Railroad line, with remnants of a Santa Fe Pacific Minerals Corporation siding onsite. Cave Mountain was probably created by faulting action and is made of intrusive or metamorphic rocks, including marble. The Crucero Plain alluvium is mainly silt and sand with a few gravels (Thompson 1929) ... Vegetation is mainly the Creosote Bush series, with some crawling mesquite. *Chilopsis saligna* (desert willow) is abundant, as are *Distichlis spicata* (salt grass), *Hilaria rigida* (galleta grass), *Petralonyx thurberi* (honebush), and *Croton Californicum* (dove clover) (Thompson 1929).

CULTURE HISTORY BACKGROUND

Numerous anthropologists and archaeologists have attempted to summarize the culture history background of the Mojave Desert. In one summary for the area, McCorkle and Lilburn (1992:6) state:

> While much is known about the prehistory of the Mojave Desert, relatively few formal archaeological investigations have been conducted in the southern portion of the central Mojave. As a result, little specific regional information on prehistory is known. General summaries can be found in Stickel and Weinman-Roberts (1980), Warren (1980, 1984), and Warren and Crabtee (1986).

Chronological Framework

> The earliest generally accepted evidence for human occupation of the Mojave Desert dates from around 12,000 B.P. Claims have been made for much earlier dates (e.g. Simpson 1958), but as Warren and Crabtree (1986:184) note, these are controversial and bear little relationship to later cultural developments in the region.

Sites dating to the Lake Mojave period (12,000 to 7,000 B.P.) serve as the basis for our understanding of the earliest undisputed occupation of the Mojave Desert. Sometimes considered a Paleo-Indian assemblage, the Lake Mojave complex is thought by some researchers to be directly ancestral to the subsequent early Archaic cultures (Warren and Crabtree 1986). Lake Mojave period sites are usually open air sites and are limited to the surface, although sites with substantial subsurface deposits have been recently identified in the central Mojave (Jenkins 1985).

Since sites of the Lake Mojave period are often found in association with Late Pleistocene/Early Holocene lake stands and outwash drainages, some researchers have suggested that lacustrine resources were a subsistence focus. Others argue that grasslands suitable for the grazing of Late Pleistocene mega-fauna would have surrounded the terminal Pleistocene lakes, and that this was the main subsistence focus of the Lake Mojave cultural groups (Warren and Crabtree 1986). Regrettably, few sites dating to the early part of the Lake Mojave period have been excavated and little direct evidence of subsistence practices has been reported. Recent excavations of sites dated to the latter part of the period have revealed an unexpectedly high incidence of small mammal bone relative to large mammal bone. This suggests that we may need to refine our ideas about the subsistence focus of Lake Mojave cultures, or at least grant that substantial subsistence change occurred during the period.

Artifacts typical of the period include leaf-shaped points and long-stemmed, narrow-shouldered points of the Lake Mojave series and the short-bladed, shouldered points of the Silver Lake series. A variety of large scrapers and flaked stone crescents are also considered diagnostic of the period. Milling equipment is thought to be rare or absent (Amsden 1937). Fluted points are sometimes found in possible association with Lake Mojave sites, but their cultural and chronological relationship to the stemmed point series remains questionable.

Relatively little material from the Lake Mojave period has been documented in the southern Mojave. Some of the earliest widely accepted finds come from the Black Butte site (CA-SBR-1554). This site is located on the south side of Black Butte, a volcanic plug approximately 6km west of the Troy Lake period Pinto points but also contains a Lake Mojave point, a Silver Lake point and two items tentatively identified as crescents (Lord 1987).

The next identifiable period in the Mojave Desert is that associated with Pinto series points (Warren and Crabtree 1986). Although period mar-kers, some questions remain concerning their placement in time. Two scenarios exist, both of which are tied to the transition to arid conditions in the middle Holocene. Some archaeologists (Donnan 1964; Kowta 1969; Wallace

1962) have proposed by the desert was essentially abandoned between 7,000 and 5,000 B.P. Other researchers (Susia 1964; Tuohy 1974; Warren 1980) argue that no evidence of an occupational hiatus of any great magnitude exists within the archaeological record. Central to this debate are the definition and dating of Pinto points (Warren and Crabtree 1986). The problem is complicated by the fact that points morphologically similar to Pinto points occur generally later in time in the central and eastern Great Basin than do true Pinto points in the Mojave (Thomas 1981; Vaughan and Warren 1986).

Like sites of the preceding period, Pinto sites are typically found in open settings in relatively well-watered locales. Early Pinto sites have been found in close association with late Lake Mojave sites, lending support to Warren and Crabtree's suggestion that the Pinto cultures developed directly from the preceding Lake Mojave ones. The Pinto period signals the beginning of cultural adaption to the desert, an adaptation to the more arid conditions. Grinding tools were incorporated into the artifact assemblage, suggesting that the processing of hard seeds became more important in the subsistence system. It is, however, generally thought that Pinto peoples maintained a mobile subsistence strategy, focused primarily on hunting large mammals.

A time of greater effective moisture in the Mojave dates to approximately 4,000 B.P. This time period, sometimes referred to as the Little Pluvial (Warren 1980), also corresponds to a new era in Mojave Desert pre-history. It was during this time, the Gypsum Period (4,000 to 1,500 B.P.), that more favorable environmental conditions allowed an increase in the population (Elston 1982). Ritual items such as zoomorphic rock art and split-twig figures are thought to indicate a continued emphasis on hunting, while the increased importance of processing of plant foods is indicated by an increase in the frequency and diversity of groundstone implements (Warren and Crabtree 1986). Open sites are in evidence, along with rock shelters and caves. Such sites have yielded perishable goods including basketry and atlatls from the Gypsum period. Habitation sites with well developed middens are found in association with water and near resource areas. During this period shell beads from coastal California are found in the desert for the first time. Trade activity appears to have been greater in many parts of the Great Basin during the Gypsum period (Bennyhoff and Hughes 1987).

West of the project area and just south of Troy Lake is Newberry Cave. This Gypsum period site contained a number of Elko and Gypsum points, along with perishable items. The collection from Newberry Cave is notable for the number of apparent ritual items, including split twig figures, painted stones, quartz crystals, a sheep dung pendant and pictographs.

Eastgate and Rose Spring points began to dominate artifact assemblages in the Mojave sometime after 2,000 B.P. (Lyneis 1982:176). In the chronology presented by Warren and Crabtree (1986) these are assigned to the Saratoga Springs period (1,500 B.P. to 750 B.P.). This time period was marked by an increase in regional differences, except in the northwestern Mojave where sociocultural continuity seems to have occurred (Whitley 1988).

Basketmaker III and Anasazi developments occurred along the tributaries of the Colorado River. Anasazi "influence" in the form of painted ceramics extended well into the eastern Mojave. Although the exact nature of this influence is not completely understood (Lyneis 1982), it seems probable that the increased distribution of these painted ceramics resulted from exchange rather than by Anasazi attempts to greatly expand their territory. Different influences were felt in the southern Mojave. Here Hakatayan (or Yuman) ceramics similar to those originating in the lower Colorado River occur, along with Cottonwood points. This interaction is most evident along the Mojave River, supporting the widely held conclusion that the Mojave River served as a major trade corridor connecting the coastal portion of California with regions to the east (Warren and Crabtree 1986).

The Oro Grande site in the western Mojave may be a key site in understanding varying cultural influences during the Saratoga Springs period. Situated on the Mojave River near Victorville, this site contains a midden deposit dated to the period between 1,100 and 650 B.P. (Rector 1979). Cottonwood series points dominate the point assemblage. Significantly, no ceramics were recovered. Other materials at the site, however, were similar to those found in other sites along the river. The more gradual development of Lower Colorado River influences may account for the lack of pottery at Oro Grande although Warren (1984) considers the absence of ceramics to be strong evidence for the presence of Rogers' (1945) "nonceramic Yuman" pattern. The Oro Grande complex would then be the "initial phase" of the Hakataya influence in the upper Mojave. Warren (1984:403) proposes that the complex may not have developed in the Mojave Sinks, because the Anasazi influence may have persisted there until it was replaced by fully developed Hakatayan cultures.

The next period, the Protohistoric period (750 B.P. to contact), was marked by the presence of **Desert Side-notched projectile points** [emphasis added]. The Numic influence during this period is identified with the presence of brownware, considered typical of the Paiute and Shoshone. Based on the distribution of this brownware, the contact between the Numic and the Lower Colorado (Patayan or Hakatayan) traditions was located north of Soda Lake and Cronise Lake basins (Warren 1984:425). Recent work in the region appears to support this conclusion (Schneider 1988; Jenkins 1986; York 1989). Protohistoric period sites include habitation sites with

developed middens, located near reliable water sources. Temporary camps and a variety of resource procurement and processing stations also occur.

A study completed by Earle (2004) for the Fort Irwin region and presented a detailed ethnohistoric and ethnographic overview for the Central Mojave region. This data (Earle 2004:20-143) reads:

6.0 The Mojave Desert Environment

6.1 Physical Geography of the Mojave Desert

The characteristics of aridity and high summer temperatures and a consequent relative scarcity of animal feed made the Mojave Desert region unattractive to Spanish and Mexican colonists during the late eighteenth and early nineteenth centuries. This perception of the Mojave Desert as a wasteland persisted after the commencement of American rule. Only gradually did an interest in mining and a more or less obligatory development of transportation corridors through the desert bring larger numbers of settlers into contact with the desert environment. These newcomers were often largely unaware of the important environmental differences found within the Mojave itself.

The most fundamental characteristic producing the desert environment in southeastern California is the mountain uplift responsible for sealing off the desert from the moderating temperature influences of the Pacific Ocean and for limiting rainfall east of the mountain zone. East of the uplifted ranges, characteristic vegetation communities and distinctive geological processes reflecting patterns of low rainfall can be observed. Yet what is also evidence to the careful observer is a surprising degree of variation in available moisture and plant community composition within the desert. This variation can often be attributed to the effects of verticality or variations in altitude of different landforms. Thus lowland and upland areas are characterized by important differences in amounts of available moisture.

The central portion of the Mojave Desert can be described topographically in the following terms. In the northern part of this region, the Argus, Panamint, and other mountain ranges lying to the east of and roughly parallel with the Sierra Nevada dominate the landscape. To the south of these is a region of low mountains and broad playa basins, within which is found the bulk of Fort Irwin. These low mountains and valleys trend in an easterly-westerly direction due to the arrangement of fault blocks associated with the Garlock fault system. To the southwest of this area lies the Antelope Valley, a region of low buttes and playa basins at about 2600 feet [792m.] altitude,

and to the south is located the river valley corridor of the Mojave River. South of the Mojave River another region of low mountains and playa basins somewhat similar to that of Fort Irwin is encountered. This area is also transected by fault systems. To the west of this area is the valley corridor of the upper Mojave River, which flows from southwest to northeast, and to the south if it lies the great mountain mass of the San Bernardino Mountains, which reaches an altitude of over 10,000 ft [2048m.].

To the east of the Panamint range in the north, and to the east of the low mountains in the Fort Irwin region, and to the east of the eastern terminus of the Mojave River is found a lowland zone extending southeastward from the northern end of Death Valley through the central Death Valley region, the Amargosa area, and the Sinks of the Mojave. To the east of this lowland zone a series of southerly trending mountain masses are encountered, from Mount Charleston in the north, through the Kingston, New York, and Providence ranges further south. These upland areas include blocks of higher altitude plateau lands like those found east of Halloran Springs.

6.2 Regional Water Resources

The changing distribution of water resources over time within the Mojave Desert has obviously affected the location and intensity of native activities in the region. Local characteristics of the desert water regime have been determined by the interaction of topography, geology, rainfall, and air temperature patterns. There is a surprising degree of environmental variation in the desert in respect to the availability of water resources.

Both coastal and westerly interior Southern California are affected by a rainfall regime in which most precipitation occurs during the winter months, that is, between October and April. High pressure systems generally seal off Southern California from storm systems and rainfall during the months from May through September. Rainfall in the desert interior varies within the 3 to 7 inch [78-178 mm.] range. The sealing effect of mountain topography also causes summer daytime temperatures in the desert interior to be much hotter, and winter nighttime temperatures to be much colder, than is the case in the nearby coastal zone. These temperature differentials are also partly responsible for promoting high wind conditions that are characteristic of the Mojave Desert, especially during the spring and fall.

The eastern portion of the Mojave Desert lying within California may also be affected by significant summer rainfall during some years. This is caused but the extreme northwestward extension of tropical summer monsoon air masses from northern Mexico which may sporadically break into the California summer high pressure system from the southeast. There is a roughly inverse relationship between the frequency of such summer precipitation and the volume of winter storm precipitation. -Areas on the Cali-

fornia-Nevada border which receive 2-3 inches [50-60 mm] of summer monsoon rainfall, may receive 4.5 inches [114 mm] of winter season rainfall, much less than at the western edge of the Mojave Desert (Hall 1976:75). This summer monsoon air infrequently passes to the west of the Victorville vicinity, but is more commonly found to the east.

The distribution of water resources in the Mojave Desert emphasizes the importance of what we might call a dynamic or verticality for subsistence and settlement systems. Upland areas have an advantage in terms of both plant life and the existence of springs. However, this regime correlating altitude and moisture has a twist, since water flows downhill but cannot escape the alluvial basement in the closed basins of most of the Mojave Desert, except by evaporation. Thus, larger lowland basins that receive little direct rainfall but sufficient down slope subsurface water flow may nevertheless feature a ponding of water that creates springs, winter ponds, and even mesquite woodland zones.

Around the rim of the Mojave Desert, to the southwest, west, and northwest, the transverse ranges and the Sierra Nevada ranges contributed surface and subsurface water flow to desert areas sometimes located at a considerable distance away. The volume of runoff contributed was very substantial in comparison to that generated in areas deeper in the desert to the east. Runoff from the San Bernardino Mountains conveyed by the Mojave River fed springs in the Soda Lake region in the central desert, for example. Upland areas in the desert itself receiving significant moisture included the Panamint, Charleston, Kingston, and Providence Mountains, all of which featured areas above 5,000 ft [1524 m.] where pinyon was available. These upland zones within the desert itself tended to have a greater abundance of springs than lower altitude areas.

7.0 A Regional Overview of Native Settlement, Subsistence, and Social Organization in the Mojave Desert-Colorado River Region at Spanish Contact

7.1 Native Groups and the Fort Irwin Region

In the following sections I will discuss the subsistence and settlement characteristics, social organization, and ritual and mortuary practices of native groups that occupied or used the central Mojave Desert. Discussion of these characteristics will serve to elucidate the economic and social bases of resource use in the Fort Irwin area by members of these groups. As will be apparent, the groups in question exhibit major differences in subsistence and settlement systems and in social organization. Sedentary horticulturalists, semi-sedentary territorial hunter-collectors, and mobile foragers all used Fort Irwin and its immediate vicinity. Thus the manner of use or occu-

pation of the Fort region by these different types of groups also varied, with differences in population density and settlement characteristics being particularly important in this regard.

In addition, cultural concepts of territoriality, territorial occupation, and supra-community cultural and political identity varied greatly between these groups. The horticultural Mojave, for example, possessed as a cultural-linguistic group a sense of "tribal" political solidarity that was rather unique for California native groups. Mobile foraging groups in the region, on the other hand, had a sense of political identity more clearly focused at the community and family level. The differences between these groups in respect to issues of politics had partly to do with the extent to which they were organized into corporate kin and /or community groups of some sort. Corporateness in this sense was in turn linked to issues of demographic density of occupation and use of defined territories. For the horticulturalists. Territoriality was a particularly central cultural and political concern. This is discussed further in the next section.

7.2 The Takic-Numic Frontier in the Mojave Desert in the Eighteenth Century

Both the Fort Irwin region and areas to the west, including Edwards Air Force Base, were bisected in an east-west direction by an overlapping boundary between areas of occupation and use of the Takic-speaking and Numic-speaking groups at the end of the eighteenth century. Ethnic groups of Southern Numic speech affiliation were found in the regions to the north and east of the lower Mojave River and Mojave Sink, and to the north of the Antelope Valley further west. Further to the west in the Tehachapi Mountains this boundary could also be found. The territory of the Takic-affiliated Kitanemuk, who spoke a dialect of Serrano, in the southern Tehachapi Mountains bounded that of the Kawaiisu, who occupied the Tehachapi Valley and adjacent areas, to the north of the Kitanemuk. The Kawaiisu spoke a distinct language closely related to the 'Southern Numic' Language spoken by the Chemehuevi and Southern Paiute (Miller 1986:99).

Just to the east of Fort Irwin, this east-west language and culture boundary terminated at the eastern edge of the Soda Lake sink area, also the terminus of the Mojave River and Soda Lake region, the desert zone to the southeast and east was held by the desert branch of the Chemehuevi. The Soda Lake area represented one of the most easterly outposts of Serrano-speech occupation of the southeastern California desert, along with Mara or Twentynine Palms, 65 miles [105 km.] to the south.

This reconstruction of language group distribution in the region has been supported by information from the 1770s. It should be kept in mind, however, that a group called the Dessert Mojave may have occupied portions

of Fort Irwin, the Mojave River, the New York- Providence Mountains region, and other adjacent areas. As is discussed in Section 7.5.11, ethnographic testimony and other evidence suggests that is occupation may have occurred before 1770. This cannot yet be treated as an absolute certainty, however, given the fragmentary nature of the information on this issue that we have to work with ...

7.4 The Serrano

7.4.1 Serrano Territory and Social Organization

During his two journeys from the Colorado River to Mission San Gabriel in 1774 and 1776, Fr. Francisco Garces referred to a native group occupying the upper reaches of the Santa Ana River which he called the Jenigueche, following the Mojave term Hanyuveche. This group was what was later called the Serranos or “Mountain People” by the Spanish. Garces contrasted this group with the Jecuiche (Mojave Hakwicha) or Cahilla, who lived immediately to the south of them, and also with the Indians of “San Gabriel”, or Gabrielinos, in the Los Angeles region. Garces associated the Serranos with what he called the Valley of San Jose, the modern San Bernardino Valley. Villages belonging to this culture group were found in the San Bernardino Mountains and in foothill and valley areas surrounding this range ... The Serrano were subjected to missionization by the Franciscans, particularly after about 1795, and most community populations were brought into the missions before mission decline in the 1830s. Some Serrano populations were active in the San Bernardino Mountains region during the mid-nineteenth century. The Malki (later Morongo) and San Manuel reservation were eventually established for Serrano survivors in 1873 and 1893, respectively.

Ethnographic fieldwork among Serrano-speakers was carried out in the early decades of the twentieth century by Alfred Kroeber (1925), E.W. Gifford (1918), William Duncan Strong (1929), Ruth Benedict (1924), and John Peabody Harrington (1986). Gifford had become interested in the distribution of clans and moieties in southern and Central California. Among Takic speaking groups in Southern California, the so-called “mission Indians”, he claimed to have found a common pattern. Patrilineages that resided together were organized into exogamous localized clans belonging to either the Coyote or the Wildcat moiety. Gifford reported this pattern among the different Cahuilla divisions, the Cupeño, and the Serrano. According to this social organizational model, Serrano families were grouped into local patrilineages. Such lineages of related males were themselves combined into a larger social unit, the localized territorial clan. This kind of clan, which could also perhaps more properly be called a sib, grouped it members in one place or region, and was not dispersed. (Gifford 1918:177–179). It functioned, according to Gifford, under the leadership of a single hereditary

paramount chief. This type of group was seen as being territorial in the sense that it laid claim to a specific bounded territory on the landscape, with corollary rights to control access or trespass by outsiders.

Gifford also noted that these localized groups were associated with either one of two ceremonial divisions, the Coyote moiety and the Wildcat moiety. These were ceremonial divisions that were opposed in ritual setting and also regulated marriage between localized groups (Gifford 1918:179-182). Some native consultants indicated that other super-naturally associated animals aside from Coyote and Wildcat may also have been associated with either of these two moiety divisions.

Gifford was given to believe that marriage was village exogamous. In addition, members of localized groups or clans thus seeking spouses in other communities could only find them in communities opposite moiety affiliation from their own. Coyote moiety clan members were thus allowed to marry only members of the Wildcat moiety clans. Such a pattern of social organization would have important implications for inter-clan interaction.

The research of William Duncan Strong among the Serrano in the early 1920s added considerable detail to Gifford's sketch of Serrano social and political organization. He noted that Serrano localized clans were headed by a single chief, called a *kika.* This chief acted as both a political and ceremonial leader for the clan group. In his care were a sacred house and surrounding dance enclosure. This sacred structure was an important element in the religious practices of Southern California Takic-speaking groups. It was known in the region under a number of different names– *wamkish* (Juaneño) or *yevar* (Gabrielino/Tongva) or *kitcateratc* (Serrano).

Strong was told that among the Serrano, the ritual division of labor between the chief and the religious officer that we might call a master of ceremonies, the *paha*, had formerly placed a greater emphasis on the ceremonial leadership of the latter than was the case with some other Takic-speaking groups (Strong 1929: 18-19). Strong noted that the sacred bundle, *muurtc*, was apparently kept in the care of the *paha*. He served as a messenger of upcoming ceremonies, carrying shell beads between groups. He divided food and other exchange goods at ceremonies, and Strong was told that the *paha* had traditionally presided over a number of ritual events.

Strong had found that hereditary chiefs clearly exercised priestly functions among Takic-speaking groups- the Cahuilla, Cupeño, and Luiseño. In the latter cases he spoke of the fundamental ideological importance of the triad- 'chief- sacred house-sacred bundle' in epitomizing the identity of the clan. He was also able to observe a rather more intact ritual life among these latter groups than among the Serrano. Thus he was unsure whether Serrano chiefs had in fact surrendered some portion of the chief's ritual primacy

to the *paha*, a clearly subordinate position in the other groups. Nevertheless, it was suggested by both Strong and Benedict that the Serrano chief or *kika* probably formerly dwelled in the *kitcateratc* (sacred house), as did the chiefs among the other Takic-speaking groups (Strong 1929:20-21).

The *tcaka* or signer, who knew all the clan songs, also played an important role in ritual life. This was also a patrilineal hereditary office. The clan songs were sung at the mourning ceremony and other rituals.

In addition to the chief, the *paha*, the singer, and the sacred house, the sacred bundle was another centrally important element in the religious life of individual clans. This bundle consisted of sacred feathers, dancers' feathers, rattles, head plumes, magical wands, and shell beads, wrapped in a special matting, of seas grass, yucca fiber, or tule. The sacred bundle was hidden either in the sacred house or in a cave when not in use. During the periodically celebrated Serrano mourning ceremony it figured prominently in ritual activities in the sacred house (Strong 1929:17-22). As Strong observed, Ruth Benedict had been the first to focus attention on the cultural importance of the sacred bundle among southern California Takic-speaking groups (Benedict 1924:391). The sacred bundle (Cahuilla Maiswat) figured importantly in Cahuilla ceremonial and religious life. Bean (1972:88-89) described how the bundle embodied the sacred connection of local clan or sib groups to their territories, their clan songs, and to the past era of creation of mankind, of food, and of social and religious practices. As Bean has indicated, the clan as a group but also as a holder of territory.

Strong also recorded evidence of a complex system of mutual ritual interdependence between certain clans of opposite moiety affiliation. Cases were found where the paha of one clan would perform ceremonial duties for another closely allied clan, and himself act as custodian of the other groups's sacred bundle. However, the evidence presented does not make it clear whether the idiosyncrasies of this ritual interdependence were due to the loss of *pahas*, chiefs, and other ritually knowledgeable people during the course of the late nineteenth century. Nevertheless, whether or not these particular forms of ritual interdependence were signs of cultural decay or an unusual local Serrano development, the strong bonds of ritual and martial reciprocity between certain clans of opposite moiety affiliation were clearly fundamental features of the traditional culture. Reciprocal behavior between clan groups in feasting, mourning ceremonies, marriage exchanges, and access to hunting and plant collecting territories was the basis of regional sociopolitcial interaction between autonomous clans. This interaction was epitomized by the ritually regulated exchanges of food and other goods that took place between groups during the mourning ceremony. The laying aside of resources for such feasting events was an important consideration in clan economics activities. Here, as among other southern California Takic-speaking groups, we can see the incipient emergence of a ritual

mode of production, where productive activities are spurred by the need to stockpile food or goods for ritual events and related feasting that confer prestige on local group leaders. Among the Serrano, chiefs practiced polygyny, and were thus outfitted with additional acorn processing labor to assist in the preparation of fiesta resources.

The research of Strong appeared to confirm Gifford's social organizational sketch, and added much new information about the relationship of ritual to political identity. It was also helpful in correcting the mistaken view of Serrano moiety organization and marriage put forward by Ruth Benedict (1924). She had insisted that each Serrano community was in fact composed of a number of intermarrying clans. However, Strong's treatment left unanswered some questions about exactly how Serrano localized clans were territorially organized. The unpublished field research of John P. Harrington with Serrano consultants in 1918 has provided extremely useful information about the territorial occupation aspect of Serrano social organization. In discussing his information on how different divisions of the Serrano were organized into clan groups that occupied defined territories, we will note characteristics of Serrano settlement that sharply distinguish them from Numic-speaking groups like the Chemehuevi.

7.4.2 Serrano Settlement and Subsistence in the San Bernardino Mountains Region

Serrano-speaking communities in the Mojave River region to the north of the San Bernardino Mountains were certainly among the native groups that most frequently used the Fort Irwin region. It is likely that some Serrano-speakers belonging to localized clans in the San Bernardino Mountains and foothills maintained the relatively large community population sizes, 40-80 individuals, that were characteristic of the Serrano. The Serrano localized clans occupied fixed bounded territories. The ethnographic research of J.P. Harrington is particularly helpful for mapping out the territories and boundaries of some of the historically known Serrano clans within the mountain region itself (Harrington 1986:III:98).

The Serrano of the San Bernardino Mountains region occupied winter villages located in lower altitude canyon and foothill areas, avoiding the heavy snowfalls characteristic of the mountain plateau in the winter. Portions of clan territory in the mountain uplands were visited during the summer months, when temporary camps were established. In the mountains, areas of yellow pine forest were interspersed with slightly lower altitude woodland zones containing pinyon, an important resource, as well as black and canyon live oak. These latter were abundant on the north slopes of the range, particularly the canyon live oak, permitting the movement of large quantities of acorns northward to Serrano communities on the desert side of the range.

Foothill resources of importance included hollyleaf cherry (*Prunus*), *Yucca*, *Salvia*, and juniper berries, a major local food crop. The core area of the Serrano was organized into at least 10-12 localized clans, with additional valley communities also located to the south of the range, and others to the north on the Mojave River, discussed below. The larger Serrano villages numbered at least 60-80 people ...

7.4.4 Serrano Settlement in the Mojave River Region

Kroeber's 1925 description of the Vanyumè of the Serrano treated them as poor, small in number, and little known. However, additional light had been shed on Mojave River Vanyumè settlement and other characteristics by several sources. Accounts written by Franciscan missionary Fathers Francisco Garcès, Josè Maria de Zalvidea, and Joaquin Nuez, and Spanish soldier Francisco Palomares mention Mojave River settlements and other aspects of native life in the region (Cook 1960:247-248; Coues 1900:235-246; Palomares1808:236-245,263-267).

Garces traveled across the desert from the Colorado River and up the Mojave River Summit Valley in March of 1776. In May of the same year, he returned eastward from the Barstow area to the south shore of Soda Lake. Fray Jose Maria de Zalvidea, famed and notorious as the head missionary priest at Mission San Gabriel for many years, accompanied an expedition of exploration to the San Joaquin Valley, the Antelope Valley, and the upper Mojave River in the late summer of 1806. Spanish soldier Francisco Palomares made several frontier forays to the southern California interior to round up runaway native neophytes in 1808. This included an expedition that crossed the Antelope Valley before reaching Atongaibit on the upper Mojave River and then Guapiabit in Summit Valley. In 1819, Fr. Pascual Nuez of Mission San Gabriel served as diarist of a military expedition ordered to march down the Mojave River and across to desert to the east to punish the Mojave River and across to desert to the east to punish the Mojaves of the Colorado River for frontier attacks. Nuez provided the names of a names of a number of rancherias visited along the river at that time ...

The account prepared by Father Pascual Nuez of the 1819 punitive expedition mentioned villages that were visited on both the upper and lower Mojave River. Nuez's expedition log has traditionally generated more confusion than insight because in it he cited distances using a value for the Spanish *legua* or league about one-third of the standard length of circa 2.6-3 miles [4.2-4.8 km.]. This had thrown readers of his account off in respect to the location of the native communities ...

Additional place names for the lower Mojave River region were also gleaned from Kroeber's account of the elderly female Vanyume Serrano and Ahamoha in Mojave was the birthplace of Moha. She placed it near to and

west of Daggett, when interviewed by Kroeber in 1903. Another Mojave consultant mentioned a place called Ahamoha north of Daggett, according to Kroeber (1959:299-300). Nuez, in 1819, noted a source of water on the river adjacent to Elephant Mountain, where the metate quarry was located. This mountain created a narrows in the river between Barstow and Daggett, and Moha's natal settlement may have been located in this area. A Mojave salt song also mentions Yava'avia th'i, a salt deposit near Daggett (Kroeber 1925:762). Interestingly, both Garces and Nuez found no native habitation sites located here. Moha also named a place called Aviahnalye ("gourd mountain") in Mojave, as the birthplace of her father. Chokupaye was the Mojave name of another village which she indicated as the birthplace of her mother. With the information that we have in hand, it is yet impossible to locate these settlements.

Permanent settlements located upstream from Barstow included Sisugenat, Cacaumeat, and Topipabit. These are mentioned in mission sacramental registers and in the Nuez account (Walker 1986:263-267). Topipabit may have been located just north of Victorville included Atongaibit, near modern Hesperia, Najayabit, perhaps downstream on the Mojave from Summit Valley, and Tameobit at Rock Springs, east of the Mojave River (Harrington 1986:III:274,313,411) ...

7.4.6 Serrano Clan Territories on the Mojave River

J.P. Harrington's unpublished field notes contained detailed information on the political geography of the upper Mojave River and western Mojave Desert ... The Newberry Mountains, the Granite Mountains, and Ord Mountains and the hills and basin east of the upper Mojave River were called Temtak. It may have included regions northeast of the Cushenberry Grade and Lucerne Lake. Desert bighorn and pronghorn were the important re-sources in this region.

Harrington was also told about four remaining clan territories on the Mojave River side of the San Bernardino Mountains. Theses may have dated from the 1830-1860 era. What Gifford, Strong, and Harrington called clans, Harrington's consultants referred to as "tribes". They mentioned, first, the clan territory of the Amutskayam, associated with the village of Amutskupiabit, which extended to the north and west of Cajon Pass. A second group called the Paeveatam or Perveatum occupied portions of the northern San Bernardino Mountains. They were said to have also controlled the Mojave River east of Barstow, the Lucerne Valley, Rabbit Springs, and Old Woman Springs. This was the far-flung territory of Temtak. Part of the Pat Kaits hills east of Victorville may have been claimed by this clan group as well. In other statements the Temtak area was said to have been a shared region. The Paeveatam hunted this region, and had mountain sheep songs which they sang in connection with this hunting. One of these was recalled as

mentioning sheep standing on the rocks at Pat Kaits near modern Victorville (Harrington 1986:III:101: 457).

A third clan group identified by consultants were, however, just remnants of a much more extensive distribution of Serrano-speech rancherias that existed in the Mojave River region in the late eighteenth century. We have listed above the known villages in this region as identified from sacra-mental registers at Missions San Gabriel and San Fernando. Each one of these communities is believed to have been the winter village head-quarters of a localized clan territory and hereditary clan chief. The Paeveatam clan's claim to the lower river, and Chemehuevi/Southern Paiute were moving up it ...

9.0 Native Ethnic Groups and the Fort Irwin Region Circa 1700-1850

The ethnohistoric information on native places in the installation region, taken with other data presented above about the territorial extent of different language groups in the region, permits a discussion of ethnic group use of the base area. This has been a subject on which a range of interpretations have been given, as mentioned in the introduction. The installation area has been variously assigned to the Chemehuevi, Southern Paiute, Kawaiisu, and Vanyume. In this section I will discuss additional newly analyzed information about political geography and native use of the immediate Fort Irwin area.

Chemehuevi consultants indicated in their accounts of the war against the Desert Mojave that localities in the vicinity of the Soda Mountains were first occupied by the Desert Mojaves, and after their defeat, by the Vanyume Serrano. The adjacent Soda Lake region is known from their information and from other sources, including Fr. Graces, to have also been occupied by the Vanyume. I have also discussed at some length the evidence making it clear that the Vanyume maintained villages in the lower Mojave River region. This may have included, at least in the early nineteenth century era, habitation sites away from the Mojave River.

Matavium and other Kelly consultants also provided information indicating that the Chemehuevi occupied the Avawatz Mountains, and exploited a salt source near the mountains. We have also presented information regarding a Chemehuevi stock-raiding rancheria that appears to have been located in the Avawatz Mountains.

Information has also been presented about the locating of the desert division of the Kawaiisu approximately in the terms suggested by Steward in 1938. A Chemehuevi/Southern Paiute source provided a southern boundary for this group. This was placed at the north end of the Calico Mountains. This and the Steward data, along with the statement of Joel Brooks in 1860

hinting about a Panamint group being headquartered just north of the Granite-Avawatz Mountains, suggests that the west and central areas of Fort Irwin may have been occupied by Kawaiisu-speakers.

Kelly's data, mentioned above, relating to the territorial occupation of the Vanyume south of the Avawatz Mountains bear further discussion. For the region between the Granite and Tiefort Mountains, Kelly had prepared a map which had this locality marked as Pitanti or Vanyume ... A valley near the Soda Lake Mountains, or a small peak to the north of them, was noted to have been located in Pitanti territory in Kelly's field notes. It is not clear if the valley of Mumukwiav was placed by Kelly south of the Granite Mountains on her map (Kelly n.d.).

The question arises as to how far north the territory of the Pitanti of Vanyume may have extended. With the exception of Kelly's information about Pitanti places west or northwest of Soda Lake, our limited ethno-historic information at hand does not provide any concrete clues about Vanyume territorial occupation at any distance northward beyond the northern margin of the Mojave River valley. In the Daggett- Calico region, the northern limit was placed at the northern edge of the Calico Mountains by a Kelly consultant. However, were recall Garces having placed the eastern limit of Vanyume territory some 3 leagues (7-10 miles [11-16 km.] east of the Mojave Sink (Soda Lake). As noted previously, the rancheria of Guanachique, described by Nuez in 1819, may have been located in this Sinks of the Mojave region. This would strengthen an argument, based on Kelly's rather cryptic information that the Soda Lake Mountains and areas immediately to the northwest and west of the Soda Lake Mountains would have been occupied by Vanyume Serrano, after the defeat of the Desert Mojave.

The interpretation of our limited information from Kelly's Chemehuevi/ Southern Paiute consultants about areas occupied by the 'Pitanti' is also dependent on assumptions about the historical timing of the apparent demise of the Pitanti or Vanyume during the 1824-1844 era, as discussed below in Section 10.8. It appears that sometime between 1830 and 1845 this group disappeared from the river region, yet I have found references to 'Pitanti' stock raiding that may have occurred later than this. This raises the question of whether later raiding activity, perhaps by displaced Serrano-speakers from the San Bernardino Mountains, was attributed to 'Pitanti' by Kelly's Chemehuevi/ Southern Paiute consultants. We know of camps of stock raiders in 1860 (Ord Mountains) and 1867 (Rabbit Springs) that were located south of the Mojave River…

9.1.3.3 Exploitation of Faunal Resources at Fort Irwin

In lower altitude environments on Fort Irwin, tortoises, jackrabbits, and chuckwallas were exploited (Eerkens 1999:301). Rabbits were found in the several mesquite thicket habitats. The hunting of cottontail rabbits and

jackrabbits was done with *Apocynum*-fiber nets. Chuckwallas and tortoises were extracted from burrows or hiding places with crooked sticks. Around desert springs, the remains of tortoise carapaces were a reminder for desert travelers of the nineteenth century of the use of this animal by native groups. Tortoise exploitation was clearly very important in late prehistoric times. The regional population of the tortoise in former times may have been more robust than imagined today. As late as the early twentieth century, tortoise populations in the western Mojave Desert were large enough to support organized hunting by homesteaders for urban markets in Los Angeles, activities which yielded literally hundreds of tortoises in a season (Pauley 1994).

At higher elevations, desert bighorn and, rarely, deer were found. Antelope may have been present as well. The presence of desert bighorn, even in low mountain environments, over a very wide area of the central Mojave Desert appears to have been an important factor in the native use of this vast desert area at Spanish contact. Areas to the south and to the north of the lower Mojave River were hunted for sheep, and residents of the Mojave River drainage would have hunted desert bighorn in the Fort Irwin region. Ethnographic information indicates that desert bighorn hunting was carried out on or near the base around the Avawatz and Soda Mountains. The organization of this type of hunting has been discussed above. The hunting of desert bighorn was thus a principal activity attracting native people to the base area.

9.1.3.4 Flora of the Fort Irwin Region

The possible intensity of dietary exploitation of plant species in the Fort Irwin area is a major issue in reconstructing patterns of native use of the region. The installation landscape supports five principal plant communities (Ferrus Garcia 1996). These include blackbrush scrub, on mountain slopes at elevations of 3,937-5,580 ft. [1,200 to 1,700 m.,] and a transitional blackbrush-creosote bush scrub ranging around the altitude interface of blackbrush and creosote scrub at 3,600-3,937 ft. [1,100-1,200 m.]. This community tends to be located on upper portions of alluvial fans. Below this transition zone is found creosote bush scrub, in areas of mountain slopes, alluvial slopes, and valley floors. This is the predominant plant community on Fort Irwin, with creosote (*Larrea tridentata)* accounting for from a quarter to over three-quarters of the ground cover in this community. A saltbush scrub community is found on dry lake margins where low soil permeability and high alkalinity, combined with characteristic low winter nighttime temperatures in these lake basins, prevent the establishment of creosote. This community is found at elevations of from 1,640-3,810 ft. [500 to 1,000 m.].

The interface between higher elevation scrub and woodland communities and creosote scrub communities is of general subsistence significance in the central and east central Mojave Desert. The valley and lowland region

that extends northward from Kelso Dunes past Baker to Death Valley ranges in altitude from 1,968 ft. [600m.] at the edge of the dunes to just under 984 ft [300 m.] at Baker, and below sea level in Death Valley. Creosote scrub is found across a wide area along the lower lying flanks of this north-south trending valley depression in this part of the Mojave Desert.

Above 3,600 ft. [1,100 m.], the appearance of the blackbrush and shadscale scrub communities represents the presence of a wider range of plant food resources of interest to human foragers (Turner 1994:162-163). This transition between communities can be very clearly seen along Inter-state Highway 15 traveling from Baker northeastward to Halloran Springs, Halloran Summit at circa 3,765 ft. [1,150 m.], and the broad plateau around Kingston Wash. In Lanfair Valley, to the east of the Providence and New York Mountains a similar transition can be seen. The transition community on alluvial fans and sloping landforms is widespread. At yet higher elevations in the blocks of mountain terrain in the region, Joshua tree woodland and then juniper-pinyon woodland are encountered. The latter appears at circa 5,000 ft. [1,524 m.]. Different yucca, agave, and juniper species, as well as pinyon pine were all economically important plants of these woodland zones. It was noted to Van Valkenburgh (1976: 13) by Mukewiune that the pinyon pine nut of the Providence and New York Mountains was different from that of the higher altitude Charleston Peak to the northeast, and was not as good, although usable.

9.1.3.5 Floral Subsistence Resources at Fort Irwin

The majority of plants that may have contributed to human subsistence in the Fort Irwin area were found at altitudes of 3,600-3,937 ft [1,100-1,200 m.], above the creosote scrub zone. Principal features of the blackbrush-creosote scrub transition community from a human subsistence standpoint are the significant presence of *Ephedra nevadensis, Ephedra viridis, Eriogonum inflatum, Lycium andersonii, Yucca brevifolia, Yucca schidigeria, Opuntia echinocarpa, and Opuntia basilaris*. This community and the blackbrush community intergrade in a manner depending on steep-ness of slope, soil type, and altitude.

On Fort Irwin, the full development of Joshua tree woodland has not been observed, although *Yucca brevifolia* is present in lighter density, as is *Yucca schidigeria*. Juniper woodland, marked by the presence of *Juniperus osteosperma* is also found at a few locations on base, while pinyon (*pinus monophylla*) is absent. Mesquite stands are present at Bitter Spring, Garlic Spring, and No-name Spring. Identifying the pre-historic or early historic presence and density of stands of mesquite in the central Mojave Desert is a problem on account of the tremendous historic destruction of mesquite habitat through groundwater removal, as well as the use of mesquite for fuelwood.

Ephedra nevadensis, Eriogonum inflatum, Yucca brevifolia, Yucca schidigeria, Opuntia echinocarpa, Opuntia basilaris, juniper, and *Lycium andersonii* all represented possible food resources in the base area. *Eriogonum* produced seeds that were gathered during the summer months. *Ephedra* seeds could be parched and eaten, as the Timbisha Shoshone were observed doing by Coville in the 1890s (Coville 1892:353; Rhode 2002:57). The berries produced by *Lycium andersonii* were a prized food among different desert groups of southeastern California, and were gathered in April (King and Casebier 1976:57; Rhode 2002:53-54). In regard to a plant that was quite likely *Lycium,* Kawaiisu elder Andy Greene wrote a letter in 1995 responding to a request for ethnographic information from Michael Baksh, in respect to an archaeological project in the Silurian Valley region. (Baksh 1997:n.p.). Greene described a red-berried bush ("currant bush") that grew in the desert, whose berries were collected in late spring by native people who lived in the desert region. These were then dried.

Yucca *brevifolia* produced flowers and fruits that were eaten. These became available in the spring. Yucca *schidigeria* also produced an edible fruit, although not as preferred as *Yucca baccata*. These two species, together with Yucca baccata, formed what Catherine Fowler has called the "yucca complex" of Mojave Desert native groups (Fowler 1995:106-107). Laird (1976:108) identified all three plants as producing … "yucca dates", a principal staple of the Chemehuevi. It is also associated with several important Chemehuevi mythological characters, the Yucca Date Girls. The fruit *Opuntia basilaris* (beavertail prickly pear) was also gathered and was a favorite supplementary food (Coville 1892:354). Golden cholla (*Opuntia echinocarpa*) provided buds that were cooked and eaten (Rhode 2002:106-109).

The above-listed species, other than Yucca and Opuntia, were plant resources more widely used when access to staples such as *Mentzelia*, *Oryzopsis*, and *Salavia*, important elsewhere in the eastern California deserts, was not possible. These latter species were not widely available at Fort Irwin. The Chemehuevi were apparently utilizing a wide array of less desirable plant food resources in the lower-altitude portions of their desert habitat away from the Colorado River. This same strategy may have been applied to the Fort Irwin region.

For the Chemehuevi and other groups living in the central Mojave Desert, the principal staples, according to Fowler, were mesquite bean (*Prosopis glandulosa*) and screwbean (*Prosopis pubescens*), particularly common along the Mojave and Colorado Rivers, and at springs and dry lake playas, the yucca complex, and the agave complex, which included particularly *Agave utahensis* (Fowler 1995). This species was not import-ant on Fort Irwin, but in some areas of the eastern Mojave Desert, such as the Providence Mountains region, it was abundant. The basal hearts were harvested

and roasted in the spring. This was a key cultural activity for the Chemehuevi. In historic times the river populations of the Chemehuevi would head to the mountains in the spring to roast yucca, and the mountains would be dotted with roasting fires.

Eerkens (1999:304) cites recovery of archaeological evidence at install-lation sites for *Mentzelia*, *Oryzopsis*, *Descurainia sophia* (Tansy mustard), and *Phacelia* (wild heliotrope), and boxthorn. *Mentzelia* and *Oryzopsis* were important food plants for southeastern California groups. However, these species do not appear to be significant components of plant communities within Fort Irwin today, as indicated by the 1994 Fort Irwin vegetation study of Ferrus Garcia (1996).

It appears that while there were plant resources available on Fort Irwin that would have helped provision camps located in the area, these were not of a type and abundance that would seem likely to have attracted focused exploitation by groups abased in other areas. Desert bighorn hunting and other faunal resource procurement appear to have represented an important use of the local environment that would have been more likely to bring people into the area. Native accounts of the Desert Mojave occupying territory near the Soda Mountains and of Chemehuevis hunting in the Avawatz Mountains region emphasize the importance of the hunting of deer and desert bighorn in the region. In addition, it appear that the upland zones on the base associated with blackbrush scrub would have permitted considerably more plant food gathering activity than the creosote zone. These plants would have been exploited mainly in spring and early summer.

A consideration of the floral subsistence resources available in the Fort Irwin area points out the rather greater dietary importance of plant species usually found at over 3,600 ft. [1,100 m.], including yucca and cactus species and Lycium andersonii ...

9.1.3.7 Water Sources in the Fort Irwin Region

Four types of water sources have historically been available at Fort Irwin or the region immediately surrounding the installation.

(1) The Mojave River- This watercourse and its drainage valley are located to the south of the southern boundary of Fort Irwin. The Afton Canyon section of the river, just to the west of the river's terminus in the Sinks of the Mojave, is located closest to the installation at a distance of only 6 mi. [9.6 km.]. Between Barstow, where the river's course completes it turn from north to east, and the Sinks of the Mojave, a number of localities formerly existed where water flow was regularly found on the surface. Between modern Barstow and Daggett, surface water formerly ponded. At the Salt Lake Road turnoff from the

river near Harvard, east of Daggett, a reliable water source also existed. Around the site of Camp Cady, further east, surface flow occurred and an extensive riparian environment existed. Other surface flow locations also could be found east of there, and in the Afton Canyon area, another zone of riparian habitat and extensive surface flow was found.

(2) Ephemeral ponds in dry lakebeds - The various dry lakes located on or near the Fort Irwin installation sometimes have held quantities of standing water for brief periods after heavy seasonal rainfall events. These have typically been winter season storms that have dropped unusually large amounts of rainfall in the dry lake catchment area, although summer thunderstorms have also caused this phenomenon. Historically, for example, Red Pass Lake was also referred to as Mud Lake, and Antonio Armijo encountered water in it in 1830 when he pioneered the route of the Old Spanish Trial from Santa Fe, New Mexico. These ponding events are infrequent, particularly for the larger lake beds.

(3) Wells - A number of wells were dug by Hispanic or Anglo-American miners and travelers during the nineteenth century, including the Government Well at Tiefort Mountain, Coyote Well, Alvord Well, Langford Well, and apparently a well used briefly at Bicycle Lake. These wells cannot be considered as water supplies available to native peoples before the 1860s. The digging of such wells reflects the relative scarcity of lower altitude or playa basin natural springs.

(4) Springs - The Major water resource for native people in the Fort Irwin area is represented by a number of springs that existed in prehistoric times. Information on characteristics of these springs is presented below. It has been taken from early twentieth century sources, reflecting conditions before the impact of modern development of the installation area. Knowledge of local springs early in the twentieth century reflect the through search for dependable water sources in the Fort Irwin region made by prospectors in the nineteenth century. It is to be kept in mind that, although these springs existed and were used in prehistoric and protohistoric times, some of them did undergo modification or ‘improvement’ at the hands of later prospectors, miners, and travelers. In cases where such improvements were carried out, it is not clearly indicated that these materially increased the rates of water flow at the springs, although they did improve convenience of access to the water. As has been observed elsewhere in the Mojave Desert, the majority of reported springs are found in association with upland or mountain slope settings, particularly in the Avawatz and Granite Mountains. Playa basin springs are less numerous and more subject to mineralization affecting their fitness for human consumption.

Where available, data or estimates have been provided on the volume of water flow and on water quality associated with individual springs, as they were recorded by Mendenhall (1909) and Thompson (1929). These data need to be treated with caution, since the productivity of individual springs in the Mojave Desert appears to vary considerably over time. This suggests that long-term rainfall fluctuations may affect the yield of springs. In addition, a comparison of spring yields reported by Mendenhall (1909) and Thompson (1929) with those reported for some of the same springs in the eastern Mojave Desert in the 1960s and 1970s, suggests a modern decline in water flow for many desert springs. For observed spring flow as reported for the East Mojave Planning Unit of the Bureau of Land Management, to the east of Fort Irwin, in the 1960s and 1970s, a flow rate of a over a gallon a minute could be considered substantial (King and Casebier 1976). However, both Mendenhall and Thompson reported rather higher rates of flow for both East Mojave area springs and for some springs in the Fort Irwin region, with flows of 3 gallons per minute or more. These higher rates of flow at some springs are particularly significant in respect to the possibility that such springs could have been used in the nineteenth century by native groups to water horses or other stock or to irrigate small patches of ground where crops would be grown, as new subsistence adaptations were developed.

10.0 The Mojave Desert and the Fort Irwin Region After 1820

In this part of the report, I will outline the history of changing native use of resources and occupation of territory in the central Mojave Desert. The increasing disruption of native lifeways by outside forces after 1820 is chronicled here. These changes resulted in losses of population, denial and destruction of resources and habitat, and changes in native settlement and regional territorial occupation. These changes during the course of the nineteenth century also brought new native approaches to subsistence, as both horticulture and consumption of meat from European stock became important. Our review of processes of native cultural change is particularly important to the study as a whole because it provides a context for understanding the historical circumstances under which native ethnographic consultants provided information about both current and past lifeways.

10.1 The Spanish Mission System and the Mojave Desert

In the aftermath of the Nuez expedition of 1819 and the killings of neophyte and non-missionized Serrano/Vanyume by the Mojave in 1819, some Serrano/Vanyume continued to live on the Mojave River. As noted previously, Jedediah Smith encountered Vanyume in the Victorville region in both 1826 and 1827. The rancheria of Atongaibit was also still occupied in the late summer of 1826. Smith was guided on his 1826 trip by two Vanyume run-

aways from the missions, perhaps Mission San Gabriel, who had made their way all the way to the Mojave villages on the Colorado River. During the course of the 1820s, baptismal entries are occasionally found at Mission San Gabriel for individuals from communities on the Mojave River and the desert side of the San Bernardino Mountains (Mission San Gabriel Arcangel n.d., Entry No. 6675, 4/21/1821). The Mojave River communities appear to have been occupied as late as the early years of the 1830s. We will discuss below accounts of the massacre of Vanyume at Newberry Springs, perhaps in the 1830s. By the time of Fremont's travels through the region, only an ex-neophyte Vanyume survivor living among the Mojaves was found.

10.2 The Mojave River-Colorado River Trail and the Mojaves

Jedediah Smith made the first of two trips up the Mojave River in 1826. It is clear from reviewing his diary that, in making his way from the Colorado River to the Sinks of the Mojave, he followed a more southerly native trail than that which was later turned into the Government Road, which ran via Rock Spring through Cedar Canyon to Marl Spring. His route followed one of the main Chemehuevi trails from the Colorado River through the Providence Mountains to the Mojave River, apparently the same trail followed by Garces 50 years before. Smith planned to use the same route during a return trip to California the next year. During his 1827 trip, he was attacked at the Mojave villages on the Colorado River while getting his party across the river. This attack, so different from his friendly reception in 1826, was due to Mojave anger over the previous killing of sixteen Mojaves by another American fur trapping party under Pattie. This incident underscored the potential political difficulties of running a trail route through Mojave territory. The principal obstacle, however, for caravans bringing large herds of livestock was the crossing of the Colorado River itself. One of the reasons that the political disposition of the Mojave was so important for travelers was that they were made very vulnerable while attempting the difficult crossing of the Colorado.

While establishing the Old Spanish trail in 1829-1830, Antonio Armijo referred in his expedition log to the Mojave River as the 'Creek of the Mojave'. This was fifteen years before Fremont used the same term to designate this river. Both explorers commented upon the Mojave River route being used by Mojave for trade and travel towards the coast. During these decades, the Mojaves were not only continuing to trade to coastal southern California, but also maintained an active trade with unmissionized Yokuts groups in the southern San Joaquin Valley, as previously mentioned. Mojave consultants told John Harrington that the region to the west of the Mojave River, including the Tehachapis and the southern San Joaquin Valley, held a great attraction to the Mojaves as a trade and travel destination, despite the association of the west with poison, as I have noted previously (Harrington 1986:III:167:21).

10.3 The Old Spanish Trail

An important moment for the history of Alta California was the opening by New Mexican trader Antonio Armijo, in 1829-1830, of land communication between New Mexico and the Los Angeles region. Armijo's original route was modified by later trading expeditions into what was called the Old Spanish Trail. This route, beginning in the San Bernardino region, followed the Mojave River trail northward and eastward to a point about 9 miles [14 km.] east of Daggett, where reliable water was found on the river. There the trail, as used in the 1840s, swung northeast away from the river, heading via Spanish Canyon, Bitter Spring, Red Pass Lake (Mud Spring), and the Silurian Valley, on the way to Salt Spring, the Amargosa River, and the Las Vegas Valley.

The opening of the Old Spanish Trail had followed official efforts to es-tablish land communications between California and New Mexico by way of a more southerly route. The Estudillo expedition of 1824 had explored the Colorado Desert southeast of San Gorgonio Pass (Bean and Mason 1962). Overtures were also made to the Halchidhoma on the lower Colorado River to allow Mexican traffic to cross the Colorado in their territory. These plans served to exacerbate pre-existing tensions between the Halchidhoma and the Mojaves, who were becoming anxious about Spanish and other foreign intrusion in the lower Colorado River Valley. The Halchidhomas, as I have noted above, were defeated and driven eastward by the Mojaves at about the time of the opening of the Old Spanish Trail.

The economic logic for this first major intrusion of non-Indians into the central Mojave Desert and the Fort Irwin region was the livestock trade between Santa Fe and Los Angeles. The development of the Alta California hide and tallow trade with New England after Mexican independence was transforming the economy of the region. The pressure to build up cattle herds pushed rancho development further inland, and put a premium on reducing the size of semi-feral Southern California horse herds that were competing with cattle for pasture. A large demand for horses had developed at Santa Fe, to re-outfit traders shuttling between that settlement and Missouri via the Santa Fe Trail. Like the trappers beginning to cross the California Deserts, these were other manifestations of the increasing economic penetration of the Mexican Southwest by the Americans. Large herds of horses and mules were thus driven east to New Mexico on the Old Spanish Trail, and woolen goods packed to Los Angeles in return. California mules, in particular, became famous through-out the West for their quality, and fetched a top price, five times what they were worth in California.

The more northerly routing of the trail by Armijo had to do with avoiding the more organized native group on the lower Colorado, including the Mojave, and other troublesome native nations in Arizona. The route was also de-

signed to ford the Colorado at a point sufficiently far upstream that stock could be crossed without undue risk. Thus, the route skirted the northern boundary of modern Arizona on its way to Santa Fe. Armijo's original route may have followed the Mojave River to the Sinks of the Mojave rather than proceeding by way of Bitter Spring, but at any rate the later established trail route passed northeastward by way of that spring.

The development of caravan traffic to and from New Mexico very soon led to the New Mexicans becoming involved in buying stolen stock from desert or San Joaquin Valley native communities beyond the limits of Mexican control. In the late winter of 1833, a party of New Mexicans was detained at a crossing of the Mojave River (perhaps upstream from Barstow) with stolen stock obtained from the Yokuts of the San Joaquin Valley (Walker 1986: 123). Other such confrontations along the Mojave River or on the Old Spanish trail further northeast would occur in subsequent years. This included a battle in 1840 at La Majonera on the Mojave River.

The Santa Fe caravans headed eastward to New Mexico in the spring, when pasture and water sources were most abundant for the large herds of stock being transported. In the Mojave River and Fort Irwin areas, these herds put heavy pressure on what pasturage was available. The section of travel from the Mojave River through the east edge of Fort Irwin and on to the Amargosa River was especially difficult in terms of lack of water and feed for large herds ...

11.0 Summary: Native Groups in the Fort Irwin Region

In this report, I have presented available ethnohistorical and ethnographic information, bearing on the question of what native ethnic groups and communities may have been involved in using or occupying the Fort Irwin area during the period from 1750 through 1900 ... I have presented the limited and fragmentary information available about native use of specific areas or resources on or near the installation.

11.1 Identifying Native Groups

I have attempted in this document to delineate the different social and political characteristics that individually marked the various linguistic-cultural groups in the eastern California desert that may be thought of today as tribes or tribal groups. In order that our ethnohistorical and ethnographic sources might be adequately interpreted, some misconceptions about native groupness and group identity have been discussed. Different genres of group identity– community, regional, and linguistic-cultural- - that existed in the cultural world of the native peoples of the region have been delineated and contrasted. I have tried to indicate how "common sense" perceptions about leadership, corporateness, and political authority that are derived

> from our own cultural experience and not that of the native peoples of the region, have obscured some key aspects of the traditional conformation of native groups. The very idea of collapsing the concepts of language-cultural group and political community together creates problems in interpreting traditional native groups as they existed 100 or 200 years ago, however well such an approach may work under changed circumstances today.

Others have written on the historic/post contact periods. For example, Harry (1992:29) presented the following summary:

> Anglo settlers began arriving in the western Mojave Desert in the 1800's as the result of two economic pursuits: ranching and mining. Ranching was made possible by the seemingly inexhaustible supply of groundwater, which was pumped heavily to provide the necessary water for the ranching operations. It was not until the latter half of the century, however, when economically valuable minerals were discovered in the region, that substantial numbers of people began to flow into the area. Perhaps the most significant discovery occurred in 1862, when John Searles discovered borax deposits on what is now known as Lake Searles. To transfer the borax to the nearest railroad head, Twenty-Mule Team Road was constructed in 1883 to connect the borax supplies in Death Valley to the town of Mojave. Although the mule teams were to use the road for less than six years, both the teams and the road were to remain popular in the imaginations of the American people. The Twenty-Mule Team Road, which passes through Fremont Valley [just north of present-day Barstow] ..., was designated a National Trail in 1976 (Pat Gordon, personal communication 1992) …

In the late 1770's, Francisco Garces first encountered the Chemehuevi and then the Kawaiisu peoples when he traversed the Fort Irwin area during his exploratory expeditions of the desert regions of southern California (Coombs 1982; Cultural Systems Research, Inc. 1987; Zigmond 1986).

Approximately 50 years after Garces' trips, Jedediah Smith's expedition encountered the Chemehuevi approximately 8 miles up the Mojave River from Soda Lake (Cultural Systems Research, Inc. 1987). Other exploratory expeditions in the 1850's, crossing the Mojave Desert, reported Indian settlements marked by the presence of brush huts, empty tortoise shells, melon and squash rinds, and some rock art (Coombs 1982).

John C. Fremont's expedition in 1844 was one of the most important early surveys of the Mojave; it firmly established a knowledge of the major geographic, botanic and geologic features of the region (Greenwood and McIntyre 1980). Greenwood and McIntyre (1980) describe the railroad surveys of the 1850's:

> In the early 1850's the Federal government allocated funds for railroad land surveys to investigate a route for a transcontinental railway. Two surveys are of interest to the western Mojave region. First came the 1853 journey of Lt. Robert Stockton Williamson under the auspices of the United States Army Corps of Engineers; second was the 1853 survey of the 35th parallel by Lt. Amiel Whipple.
>
> Williamson's survey set out on July 10, 1853. Despite the results of earlier surveys of the Mojave, little was actually known about the interior area. Williamson and his assistant, Lt. J.G. Parke, added two particularly significant discoveries to the knowledge of the Mojave area. First, they confirmed the fact that Tehachapi pass was one of the better routes. And second, they discovered that the Mojave River did not flow into the Colorado. The geological report of the Williamson survey is of particular interest ..., for it is one of the earliest known impressions of any dry lake.
>
> Lt. Whipple and his survey party were under orders to survey the 35th parallel from the Mississippi River to the coast. On February 20, 1854, the group reached the Colorado and crossed into the eastern Mojave, eventually picking up the trail of Williamson's earlier exploration of the area …

The current project area is located south/southeast of Fort Irwin; south of Interstate 15 and east of Afton. "Zzyzx" is to the east and the project area is accessed via the existing Basin Road alignment. During the late historic and modern periods, Fort Irwin has been the site of significant military activities. The most notable military presence in the area between 1860 and 1871, when Fort Irwin was an outpost on the Mojave River known as Camp Cady.

The brief Carleton campaign against the "Paiutes" is represented by a small adobe rampart with a stone firing-step and miscellaneous military debris. Military activities intensified in the area when Fort Irwin was formally established in 1940, on the eve of WWII. Since being designated as a National Training Center in 1979, Fort Irwin serves as the primary U.S. Army facility for the training of brigade-sized armored units (Horne and McDougall 1997).

In 1886, the California Southern, a subsidiary of the Atchison, Topeka & Santa Fe Railway Co., completed its line from National City near San Diego through Cajon Pass to join the transcontinental line. The junction of the two lines, first known as Waterman, was changed to Barstow in honor of Santa Fe's president, William Barstow Strong, when the construction of a depot-hotel-eating house on the south bank of the Mojave River was announced that same year. The Casa del Desierto (House of the Desert), or "Harvey House," as it was more commonly known, was completed in February 1911 after a series of ownership changes left it in the hands of the Fred Harvey Company. The building was designed by Francis Wilson and represented one of the few Harvey-operated facilities not designed by architect Mary Colter. The beautiful building is now on the National Register of Historic

Places. Barstow, like many communities, suffered growing pains in its initial years. Originally located north of the railroad tracks, Barstow moved south and uphill in the mid 1920's as the railroad repeatedly expanded its facilities (California Historic Route 66 Association 2002).

The current alignment of the Union Pacific Railroad was originally completed as the San Pedro-Los Angeles and Salt Lake Railroad (est. 1901), traversing three states (California, Nevada, and Utah) and completed in 1904. This line became part of the transcontinental system in 1921, when the line was purchased by the Union Pacific Railroad (owned by E.H. Harriman). According to Gudde (1969:4 and 24, respectively, both Afton and Baker were stops along the Union Pacific Railroad (originally the San Pedro-Los Angeles and Salt Lake Railroad), and established in 1904-05. Citing Salley (1977:16), the Baxter siding "…; was named for an employee of the Union Pacific Railroad. Was the shipping point for the nearby limestone quarry. Located 7 miles west of Crucero. George A. Brown, First Post Master."

Initially, no stops were established along the San Pedro-Los Angeles and Salt Lake Railroad alignment between Afton and Baker, although access roads and references to spurs were later referenced. On the east/southeastern side of Cave Mountain, the railroad alignment runs along the south side of the Mojave River and a dike was established to protect the alignment from significant runoff from the north/northwest. The Baxter siding was established by the Union Pacific Railroad subsequent to its purchase of the mining claims in the Cave Mountain area. The spur from this siding was established later.

With specific reference to the Baxter Quarry activities, Hatheway and Duffield (1989:8-10) provided a chronological sequence (Table 2) and historic summary. The history (Hatheway and Duffield 1989:11-16) reads:

> The purpose of this summary is not to document, in detail, either the mining history f the subject property or the immediate Baxter area. Rather, it is to provide a summary of events which place activities her in property historic perspective. Exact dates are impossible to "pin down" in many instances, as sources consulted often disagree with one another. The Bureau of Land management Master Plats, for example, contain dates and imply activities which conflict with those presented in virtually every issue of the California Journal of Mines and Geology.
>
> <u>1853-1904: Surveys and the Railroad</u>
>
> On March 3, 1853, title to all of Township 11 North, Range 6 East was granted to the State of California to vest, subject to prior rights on approval of survey. Various surveys were conducted during the period extending from 1855 to 1858 … No cultural features, prior rights, or any development of the immediate project area was documented at this time, and it is likely

Table 2. Summary of Significant Activities at the Baxter Quarry Site, Cave Mountain, San Bernardino County, California.		
Date	Source	Activity
1854-1856	BLM-GLO	Surveys of Washington (1854); Wiltsie (1855); and Jones (1856) were completed, establishing the Township/Range/Section definitions.
1904	BLM-GLO	Map identified Cave Canyon Lode, Cave Canyon Mine No.1; Cave Canyon Mine No. 2; Monarch Mine and Emperor Mine (7-25-04)
1905	Patent	Mineral Patent No. 41863 (Mineral Survey 4241); Emperor Mine (4-3-05)
1905	Patent	Mineral Patent No. 41865 (Mineral Survey 4238); Cave Canyon Mine No. 1 (4-3-05)
1905	Patent	Mineral Patent No. 42090 (Mineral Survey 4240); Monarch Mine (4-19-05)
1905	Patent	Mineral Patent No. 41866 (Mineral Survey 4235); Cave Canyon Lode (4-3-05)
1908	Patent	Mineral Patent No. 46711 (Mineral Survey 4239); Cave Canyon Mine No. 2 (3-9-08)
1908	Patent	Mineral Patent No. 46712 (Mineral Survey 4604); Emperor Mine; Except Section 13 and the Dahlberg, Calcium, Hematite, and East End claims (3-19-08)
1914+/-	Purchase	E.H. Harriman purchases “portions” of the Cave Canyon Mine and transfers ownership to the Southern Pacific Company
1914+/-	Leases and co-ops	Seven companies establish a joint-mining operation to mine calcium rock; companies also lease the D.F. & S.A. Baxter and A.W. Ballardie claims. (with the American Sugar Beet Company and Sugar Lime Company)
1914+/-	Operations	60+/- men employed at Baxter mines and the SPLA & SLC Railroad establish a spur north of the Mojave River to transport ore from the mines; Baxter siding is established
1914-1919	P.O.	Post Office established at “Baxter”
1923-1926	P.O.	Post Office reestablished at “Baxter” siding
1923	Patent	Mineral Patent No. 915147 (Mineral Entry for Lots 9-13 of Section 11
1925+/-	Lime Plant	Pacific Marble Quarries established a lime plant with two lime kilns and one hydrated lime plant at Baxter = “Cave Mountain Brand”
1925	Survey	Wm. Hanna surveys Baxter limestone activities for possible cement manufacturing
1930	Tunnels	Estate of E.H. Harriman establishes the Cave Canyon Iron Deposit and digs 4 tunnels to extract ore

Table 2. Summary of Significant Activities at the Baxter Quarry Site, Cave Mountain, San Bernardino County, California (cont'd.).		
Date	Source	Activity
1938	Purchase	California Portland Cement Company (CPC) purchases Cave Canyon Mine No. 1; Cave Canyon mine No. 2; the Emperor Mine, Monarch Mine, and East End Mine from the Southern Pacific Company
1943	Transport	CPC is shipping Cave Canyon Iron Deposit claim is shipping materials to Southwest Portland Cement Company in Victorville
1943	Negotiations	CPC attempts to negotiate the purchase of claims in the Baxter area
1947	Purchase	CPC purchases the Dahlberg, Rambler, Vernon, Hematite, and Calcium, patents from the Southern Pacific Company
1950	Purchase	CPC purchases Gov't. Lots 9-13, Section 11; White Marble No. 3; Evening Star; Parcel 20 and Parcel 21 from the Southern Pacific Company
1951-54	Claims	CPC patents the claims for the Rock Wren No. 1 and Rock Wren No. 2 claims
1952	Purchase	Mojave Plant property purchases areas from Pacific Portland Cement Company (Ideal Cement Company) and other private property owners
1953	Operations	Cave Canyon deposits mined since ca. 1930 used for cement manufacture; primarily from open pit mining
1955	Operations	Mojave Plant operating continuously; primarily mining within Baxter iron deposit
1960	Patent	Sodium Permit (LA 0163217) issued for Lots 1, 2, 3, and 7 in Section 11
1973	Operations	CPC reopens mining in Baxter site, following a program of "reserve development"
1976	Patent	Mineral Entry - CA 2890 (Mineral Survey 6805); Lillian Belle No. 2 and Lillian Bell No. 3 (10-20-76)
1978	Patent	Mineral Entry - CA 49450 (Mineral Survey 6839); Lillian Belle Millsite No. 1 and Lillian Bell No. 2 Millsite (12-12-78)

that the area was traversed only by occasional travelers, and perhaps by limited continued aboriginal occupation of the general area.

The Bureau of Land Management (BLM) master plats indicate that portions of the township were granted to the Utah, Nevada and California Railroad

in 1902, and that subsequent grants were made during the period extending from 1906-1914 to the San Pedro, Los Angeles, and Salt Lake Railroad.

Various railroad surveys has crossed through or immediately adjacent to the study area beginning as early as the 1850s, but it was not until 1902 that plans were fully developed to complete what would become the present Union Pacific line directly to the south of the study area. This line segment was completed by May 1, 1905.

In summary, the project area appears to have not been subject to any historic land use and development prior to the turn of the century. The area to the south of the project area, along the route of the Mojave River, was likely used as a transportation corridor, and the area was probably visited by a number of independent prospectors. It was not until 1903-04, however, that railroad construction was nearly complete in the vicinity of the project area. By this time, and probably in association with the renewed interest in mining due to the proximity of the railroad, several Mineral Entry Patents were granted for locations within the project area.

1905-1919: Mineral Surveys, Claims, Patents, and Mining

A series of patents were granted for mine locations within the study area during the period extending from 1905-1908. Various mineral surveys had been completed prior to this date, as shown on a GLO survey map dated July 27, 1904 … and it may well be speculated that these surveys were filed (prior to 1904) due to an interest in the upcoming availability of railroad transportation. These claims were subsequently granted to the locators, who sought to secure their rights to the property in advance of the completion of the railroad line. The availability pf transportation was, in fact, a key to the development of many remote desert mining resources, a key to the development of many remote desert mining resources, for even marginal claims could become a profitable investment if the ore/minerals could be moved to market with relative ease.

Several of the claims appear to have purchased from the original locators by E.H. Harriman, one of the major investors in the Los Angeles and Salt Lake Railroad. He, in turn, appears to have transferred these claims to the Southern Pacific Company, while retaining control of a [sic] least one of them (Cave Canyon Iron Deposit) for his own use. Very little development actually appears to [sic] taken place, however, prior to 1912. A GLO map, dated to 13 [sic], 1913 … shows no major roads, trails, or structures leading to or in the vicinity of the project area at this time, although the railroad is clearly shown.

Figures 4 and 5 illustrate the study area during the early between 1856 and 1904.

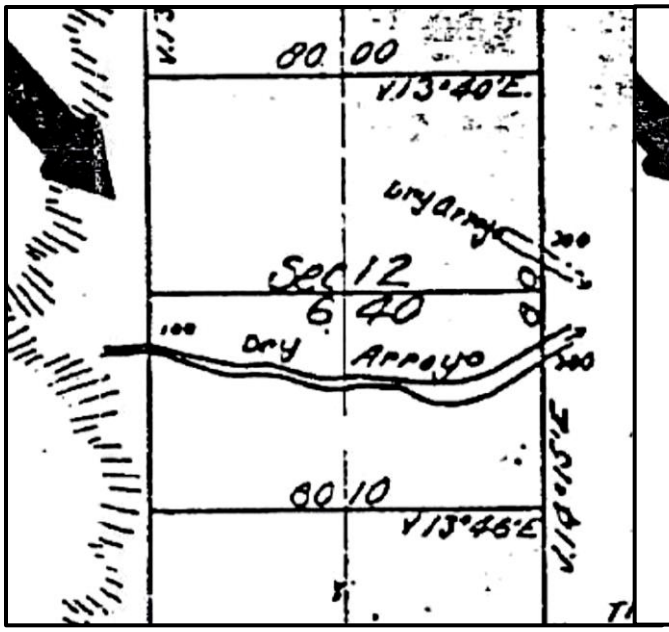

Figure 4. BLM-GLO Map of 1856.

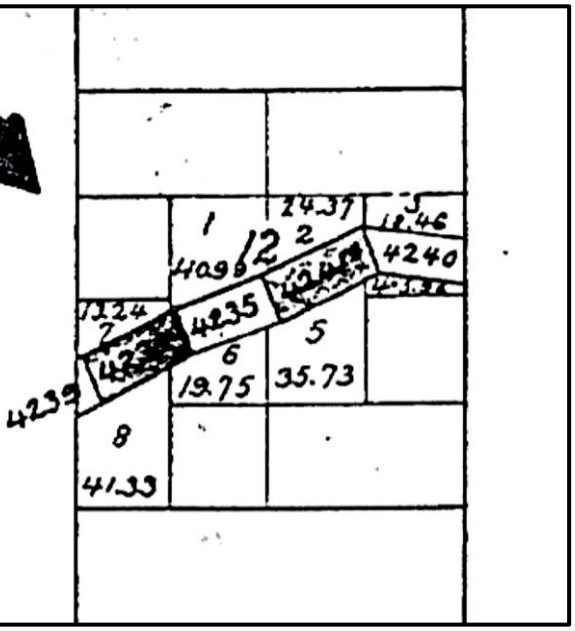

Figure 5. Mineral Survey Map of 1904.

Hatheway and Duffield (1989:12-14) continue:

> Beginning in 1913-1914, the Southern Pacific Company leased these claims to the American Beet Sugar Company, and/or the Sugar Lime Rock Company, for use in the manufacture and procession of sugar beets. This resulted in the rather intense development of mineral resources within and directly adjacent to the project area during the period extending from 1914 to 1919. Over 60 men are reported to have been employed at the Baxter mines in 1914 (Casebeir [sic] 1986:196; "Casebier"), and a post office was located there from 1914 to 1919. The focal point of these activities was immediately to the south of the present project area, and the location is today marked by massive stone retaining walls, spoil area, and dirt tracks. This period of development directly impacted the project area, and as shown on a map prepared from survey data gathered during 1917-1920 … a small trail leads northwards from Baxter siding to the location of the Cave Canyon claims. The trail probably led to the location of the Cave Canyon Iron Deposit, then still under the control of E.H. Harriman. This trail was probably incorrectly identified as part of [an] earlier cultural resource inventory as a prehistoric Indian trail (P204-23 [sic]; should be P2004-23). In addition, the railroad reported to have built a siding to the mine in 1914 (Casebeir [sic] 1986:196).
>
> In March, 1919, the post office at Baxter was closed. This probably signals the end of the first major period of mining and development of project area

and vicinity mines. In effect, nearly all mining activity appears to have been confined to the quarrying of high calcium rock for use in the sugar beet industry. The presence of other potentially valuable deposits (including iron) was known, but little effort seems to have been made to develop these resources.

1923-1930: A Second Period of Activity, Speculation, and Planning

Beginning in June, 1923, a post office was once again opened at Baxter. This is undoubtedly due to efforts made by The Pacific Marble Quarries Company to develop a lime plant here. This site was visited by William Hanna, then under contract to Pacific Marble Quarries, in April of 1925. Hanna notes that although little actual production had taken place by this date, two upright lime kilns and a small hydrated lime plant had been constructed. The success of the Pacific Marble Quarries mining venture appears to have been rather limited, for the post office at Baxter closed in June of 1926. Hanna's visit is interesting, however, in that he speculates at rather great length as to additional potential uses for high magnesium limestone found on various claims in the vicinity …

In particular, Hanna writes that "There are some large ledges of "Black Limestone" which could be used to good advantage in cement manufacture but which are worthless for use in a lime plant … The foreman now in charge did not speak in very good terms of the outlook for a lime manufacturing proposition but through it was a good proposition for cement manufacture … the ENTIRE PROPERTY COULD BE WORKED UP AS A CEMENT MANUFACTURING PROPOSITION" (Hanna 1925:2).

One additional project area mining effort appears to have taken place during this period of time. In 1930, the Cave Canyon Iron Deposit is described in Report XXVI of the State Mineralogist. This site was probably developed as early as 1914, by E.H. Harriman, and in 1930 it was [the] owned by the E.H. Harriman Estate, New York City. Development of the site consisted for four tunnels.

In summary, mining activity at Baxter area locations during the 1920s appears to have been rather sporadic. A concerted effort was made by The Pacific Marble Quarries Company to develop a lime plant at Baxter beginning in 1923, but this appears to have a sort-term [sic] proposition. A 1933 U.S.G.S. [map], surveyed in 1930, shows that a road system had been developed leading to Highway 91, but that large-scale development of the site had not taken place … Most importantly, however, the issue of the potential use [of] project area resources in the manufacturing of cement had first been raised. This would ultimately prove to be the most valuable, extensive, and long-term use of project area resources.

Not included in the Hatheway and Duffield summary of 1989 was some specific information provided by Hanna his 1925 letter report on visiting Baxter and the mining claims. Hanna makes reference to the Iron Chief Mining Company (established by Harriman in 1909). No mention of the Iron Chief Mining Company appears in the Hatheway and Duffield discussions. Also not mentioned was the establishment of a "camp" by the sugar manufacturers, the construction of a "large bridge" over the Mojave River, and/or their activities continuing with the acquisition of materials from Sloan, Nevada, since ca. 1919. The railroad spur is also not mentioned.

California Portland Cement Company began purchasing claims in the Cave Mountain area as early as 1938 and, by 1943, owned the majority of the area generally referred to today as the "Baxter Quarry." In 1943, the State Mineralogist's Reports (XV; 818; XXVII, pp. 223-334; and Bulletin 38, p. 299) describe the Cave Canyon Iron Deposit, Cave Mountain Iron Deposit, and Cave Canyon (Baxter, Basin) Mine.

> ***Cave Canyon Iron Deposit.***
>
> It is situated in Secs. 12 and 13, T. 11 N., R. 7 E., S.B.M. [should be "R. 6 E."] Holdings consist of 10 claims known as the Cave Canyon Group (all patented), about one-quarter of a mile north of Baxter, a station on the Union Pacific Railroad. Owner, E.H. Harriman Estate, New York City.
>
> The iron ore occurs on the contact of monzonite and a coarsely crystalline marble on the south, dipping southward at about 30°. The ore occurs in two belts. The western belt is 2000 feet long and the eastern 1700 feet in length. The width of the outcrop reaches a maximum of 450 feet. The average width of the western belt is 300 feet and the eastern belt has a width of 100 feet. The ore is mainly red hematite and limonite. Commercial analysis shows 60 per cent iron, with low phosphorus.
>
> Development consists of four tunnels. Estimated tonnage is 10,000,000 tons. (State Mineralogist's Report XV, p. 818; Bull. 38, p. 229; 1930)

> ***Cave Mountain Iron Deposit***. It comprises one claim, known as Arrowhead Lode, situated on the south slope of Cave Mountain, in sec. 20, T12N., R 6E., 7 miles northeast of Dunn Siding, a station on the Union Pacific Railroad, and a mile north of U.S. Highway 91; elevation 1500 feet. A small lend of iron ore occurs on contact of limestone and granite; strike northeast, dip 30° NW. The length of the lens is 200 feet and the width 6 to 8 feet. The ore is high grade hematite. In the early part of 1943, it is reported that six cars of ore west shipped to the Southwest Portland Cement Company, Victorville, California. The ore is reported to assay 60 to 64 percent iron. Idle. (State Mineralogist's Report XXXIX, p. 469; Vol. 39, No. 4; 1943)

Cave Canyon (Baxter, Basin) Mine. Location: secs. 12 and 13, T. 11 N.; R 6 E., S.B.M., one-half mile north of Basin (formerly Baxter) siding on the Union Pacific Railroad, and about 20 miles southwest of Baker. Ownership: California Portland Cement Company, 601 West 5th Street, Los Angeles, California owns 11 patents.

The Cave Canyon deposits, intermittently mined since 1930, have been a source of iron ore used in the manufacture of cement. The most complete description of the deposits has been furnished by Lamey.

The iron-bearing minerals, principally magnetite and hematite with subordinate limonite, occur in bodies that lie largely within an east-northeast trending belt about one mile long. The deposits are enclosed in a complex of metamorphic rocks (limestone, gneiss, quartzite, and schist) of possible pre-Cambrian age. The complex also contains intrusive bodies of acidic to basic igneous rock. Fragments of wall rocks are commonly abundant within the iron-bearing deposit. In general, the deposits and the enclosing rock trend east-northeast and dip at gentle to steep angles. Intricate faulting, brecciation, and simple to complex folding are characteristic.

The deposits are exposed along the south side of a small valley with a relied of about 200 feet. Their width and lateral extent are obscured by Quaternary alluvial valley fill, talus, and an older Quaternary fanglomerate. The exposed iron-bearing material lies in two principal areas, one at each end of the belt. The two bodies thus indicated are each at least 1,800 feet long and as much as 300 feet wide. A few much smaller deposits lie within a few thousand feet of the principal zone. The mineralized zone appears to be of contact metamorphic origin and largely a replacement of limestone.

Nearly all of the mine's output has been obtained from an open cut on the west body. Early in 1952 the cut, tadpole-shaped in plan, was about 800 feet long, 200 feet in maximum width and had faces mostly in the range of 30 to 70 feet high. Other workings include several shafts, adits and trenches. The maximum shaft depth is about 150 feet. The maximum adit length is about 580 feet. Mining operations were being confined to periods of a few weeks spaced at about two-year intervals. (California Journal of Mines and Geology, Vol. 49, Nos. 1 and 2; p. 93)

Subsequent (and recent) research completed by McKenna et al. added to the understanding of the development of the Baxter Quarry. According to Hatheway and Duffield (1989:8), D.F. and S.A. Baxter and A.W. Ballardie were associated with the Baxter Quarry area. No data was found by McKenna et al. to confirm this association and, as previously noted, the references to "Baxter" were associated with an employee of the Southern Pacific railroad and not a miner or mining investor. It is quite possible the Baxters and Ballardie were more directly associated with the sugar manufacturing enterprises and lease

holders, not owners. Regardless, references to “Baxter” post-date the initial establishment of the initial claims in this area of Cave Mountain and only appear after the establishment of the Baxter railroad siding.

Bureau of Land Management – General Land Office files and mineral patent data identified the following patents:

4-3-1905	M. Pluth and A.R. Rhea	20.66 Acres	Cave Canyon Mine No. 1
4-3-1905	Alfred Merritt	20.26 Acres	Emperor
4-19-1905	Alfred Merritt	15.00 Acres	Monarch
5-1-1905	Alfred Merritt	16.53 Acres	Cave Canyon
3-9-1908	Alfred Merritt	2.59 Acres	Cave Canyon No. 2
4-9-1908	Alfred Merritt	117.37 Acres	[General]
8-29-1923	Pacific Marble Quarries	118.62 Acres	Evening Star Placer
2-3-1954	John B. Lonergan	80.00 Acres	Rock Wren No. 1 Placer
11-7-1978	CalPortland Cement Co.	41.29 Acres	Lillian Belle No. 2 Lode

Marcus Pluth and A.R. Rhea: In 1905, Marcus Pluth (1854-1939) was a miner associated with Calico mining and A.R. Rhea was a physician living in both Daggett and Calico (1890s). They teamed to acquire a 20.66 claim in the Cave Canyon area with Pluth serving as the “miner” and Rhea being an “investor.” They owned Cave Canyon Mine No. 1, but there is no record of any actual mining activities undertaken.

At the same time Pluth and Rhea filed their claim, Alfred Merritt filed the patent for the Emperor Mine (20.26 acres), northeast of the Pluth and Rhea claim. Shortly thereafter, Merritt also filed for the Monarch, Caver Canyon claims, resulting in an alignment of the four claims running through the east-west “canyon” now associated with the Basin Road alignment. By 1908, Merritt claimed the small Cave Canyon No. 2 patent and another 117.37 acres of land including the Vernon, Hematite, Rambler, Dahlberg, Calcium, and East End mines.

Alfred Merritt was a native of Duluth, Minnesota, and a well-respected and renown mining magnate who, along with his brothers, owned numerous mining enterprises in Minnesota, Virginia, West Virginia, Kentucky, etc. in the 1880s and 1890s. The Merritts were considered a “founding family” in Duluth. Following business ventures between the Merritts and the John D. Rockefeller (the Merritts were financially ruined by Rockefeller by 1894), the Merrits sued Rockefeller and won, settling the issues in 1900.

With the funding received in the law suit, the Alfred Merritts family relocated to Southern California (Pasadena) and, between 1`902 and 1910, Alfred Merrits became involved in numerous mining ventures throughout Southern California, including, Los Angeles, San Bernardino, and Riverside County ventures (along with other counties). The Cave Mountain investments were considered small in comparison to other, more productive holdings, but valuable, nonetheless.

While the Cave Canyon patents date to ca. 1905-1908, a family history presented by Alfred Merritt's grandson (Grant Merritt) noted his interests in Cave Canyon dated to ca. 1902, but were not realized until after the San Pedro-Los Angeles and Salt Lake Railroad was completed and made the mining activities possible. With the railroad within one mile of the claims, the ores could be transported to the siding and transferred for refinement and/or sale. To accomplish this, Merritt entered into discussions with E.H. Harriman, who has purchased the railroad alignment for the Southern Pacific Railroad. The rail line was completed on May 1, 1905, with Harriman being one of the investors. Although the Southern Pacific Railroad (under Harriman) purchased the San-Pedro-Los Angeles and Salt Lake Railroad as a railroad asset, Harriman was negotiating the purchase of the Merritt claims and holding some of the claims for himself. Harriman's company, the **Iron Chief Mining Company**, was established in 1909, in preparation of the purchase.

Alfred Merritt was in discussions with Harriman to establish of a spur from the yet-to-be established Baxter siding to the mines for easier access to the raw materials. Harriman objected to assuming the cost of the spur and eventually just purchased the mines without the completion of a spur, possibly holding back on the spur development until Merritt was convinced to sell the claims. In either case, mining activities were very limited until after 1910, when the Merritts moved back to the Duluth area. The spur was yet to be established.

Harriman purchased the Merritt claims, along with the Pluth and Rhea claim around 1910-1912 and completed the purchase of the San Pedro-Los Angeles and Salt Lake Railroad. Although all pieces were essentially in place, the mining activities were still on-hold until ca. 1914, when the claims were leased to a consortium of sugar beet manufacturers and the Southern Pacific Railroad constructed "…a siding crossing to the north of the Mojave River …" (Hatheway and Duffield 1989:8). This would be the Baxter siding, still without reference to any spur connecting to the main rail line. The San Bernardino County Assessor records for 1919 to 1924 identified the holdings of the Iron Chief Mining Company as consisting of:

- Cave Canon [sic] Lode No. 2
- Dahlberg Claim
- Rambler Claim
- Cave Canon [sic] No. 1
- Cave Canon [sic] Lode
- Emperor Claim
- Vernon Claim
- Hematite Claim
- Calcium Claim
- East End Claim
- Monarch Claim

In 1925, Kanna, representing the Pacific Marble Quarries, wrote:

> At least ten years ago about seven sugar manufacturers or companies in southern California banded together and went out there the quarry rock for their use in the sugar plants. They desired a very pure high calcium rock,

> in sized from about 4 in. to 12 in. which would not break down in their upright kilns. They established a camp at Baxter, built a bridge across the Mojave River, and started operations on a large scale. They opened up the best rock and shipped it and placed the small rock and waste on the dumps. After they had been working for several years we heard that the good rock had been about exhausted and that the different sugar companies were obtaining rock form [sic] the Nevada Lime and rock Company, at Sloan …
>
> Two upright lime kilns have been built during the past year, one kiln turning out 8 tons of lime per day has recently started and only last week a small hydrated lime plant was placed in operation. They are also shipping a few cars of rock to Los Angeles as flux rock.
>
> They call their lime and hydrated lime the CAVE MOUNTAIN BROAD. The lime is a very high calcium, slow-slaking material and probably fully equal to the GRAND CANYON LIME.
>
> For the most part the property is just as the sugar companies left it and it is easy to see that they took out the best and easiest rock they could obtain. Part of the stone was taken from their property and a part from land leased from the S.P. Co.

Kanna made no mention of a railroad spur or tracks in the vicinity of the mining claims, only the references to roads, a bridge, and the railroad siding. It appears the spur, as of 1925, was not realized and materials were prepared on-site and still transported (via vehicles, etc.) to the rail siding for transport elsewhere. With respect to spurs, Crull (2008:17-18) states:

> … Railroad debris was scattered throughout the area … There are two railroad spurs, as seen on the 1948 and 1986 USGS maps, leading into the property from the east junction with the current Union Pacific line. These spurs were originally built by the Santa Fe Pacific Minerals Corporation during the early 1900s. The Santa Fe Railroad, which merger with the Southern Pacific, and ceased operations in the late-1980s. These spur remnants, and their associated mining features, constitute an historical landscape. The site form CA-SBR-3533H was updated.
>
> Of three spurs on the APE, only one is current and that one shows evidence that the Union Pacific built it or replaced it after 1984, as that is the data on the rails. The other two spurs have been removed, although the beds can still be located.
>
> The only viable spur, built or replaced sometime after 1984 by the Union Pacific Railroad is not significant, as the original tracks, if any, are gone and the bed has been upgraded to current railroad standards.

> The northern spur is only detected by the roadbed and the ramp where the rail cars were loaded. Railroad debris dominated the area, but the rails and ties have been removed … The center spur is only detected by the roadbed and a couple of ties. Railroad debris dominates the area, but the rails have been removed.

In reviewing Crull's documentation, it appears he uses the term "spur" in place of "siding," which would be more applicable. For clarification, the spurs noted by Crull (2008) are all south of the Union Pacific Railroad alignment and do not involve or extend into the current Baxter Quarry project area. The 1948 map referenced by Crull, however, does show the presence of spurs to the north of the Union Pacific alignment. The Crull-referenced alignments (not in the current project area) are all south of the Mojave River. Illustrated in Figure 6, the main Railroad alignment is shown in 1933, but no spurs are present. Figures 7 and 8 show the spur(s) in the southern portion of the project area are illustrated by 1948, indicating their establishment prior to 1948, but after 1933.

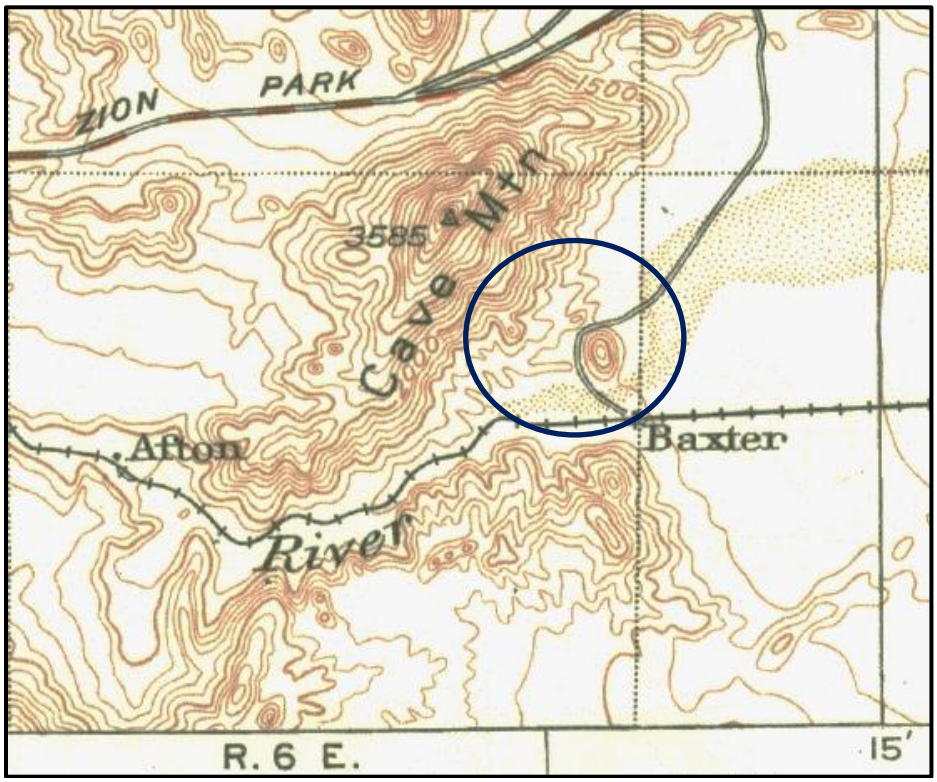

Figure 6. Avawatz Mountain Quadrangle of 1933 (1:250,000).

As illustrated, by 1948, one spur alignment runs along the base of the hills and between the hillside and the Mojave River flood plain. The other spur forks to the north and into a small canyon with an associated access road. Crull (2008:17) also provided a graphic

illustrating the spurs north of the Railroad, dated to 2006, involving right-of-way in Section 13 and extending into Section 12 (Figure 9). As such, these alignment correlate with APNs 0843-36-17 (1.96 acres); 0843-36-27 and 0843-36-28 (14.1 acres); and 26 (4.6 acres). Only Parcels -17, -26, and -27 are within the current project area. The southern extent of these spurs do connect with the main rail line and, as noted, were established relatively late – between 1933 and 1948.

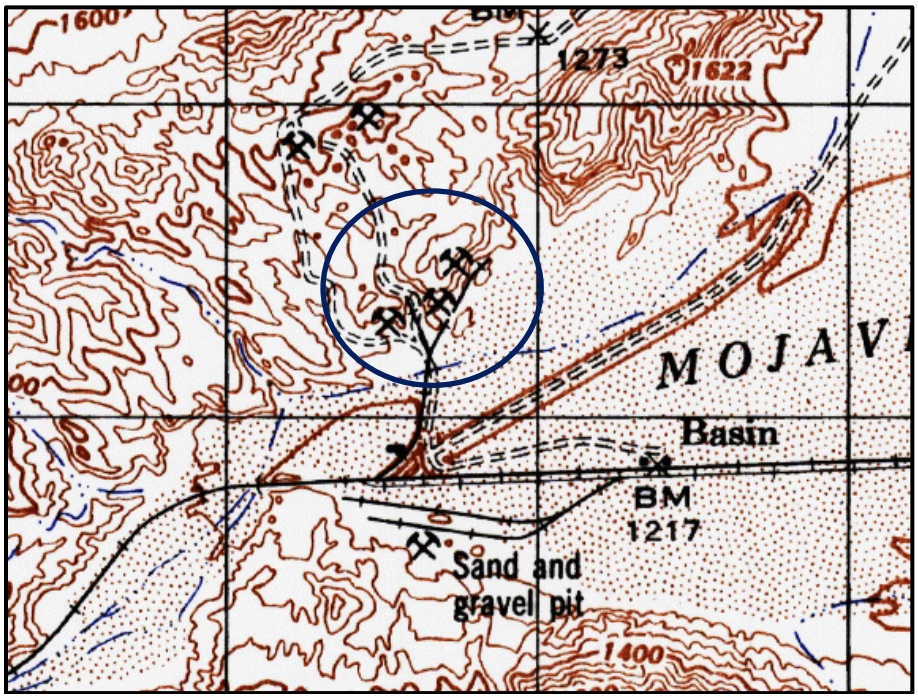

Figure 7. USGS Cave Mountain Quadrangle of 1948 (1:50,000).

Basic research indicates the spurs north of the Railroad were established between 1933 and 1948 and likely post-dates the associated with the CalPortland mining activities and the extraction of materials to be used in cement manufacturing. This would date the spur to between 1938 and 1948. The mining was limited to Section 12, while the majority of the spur alignment were within Section 13 (not owned by CalPortland, but within an easement). The southern extent of the spurs (in Section 13) were not privately owned until the Wren Rock claims were established in ca. 1980. By 1950, the California Portland Cement Company had acquired all of the prior claims, with the exception of the yet-to-be identified Wren Rock claim (Lonergan). The San Pedro-Los Angeles and Salt Lake Railroad (southern Pacific/Union Pacific) held a right-of way through the Lonergan claims, providing access between the CalPortland holdings and the Baxter siding.

There is no documentary evidence confirming the Lonergan Wren Rock claim was ever worked, although maps dating to 1948 identify claims in the area. CalPortand purchased the Wren Rock claims in ca. 1951, extending the CalPortland holdings into Section 13.

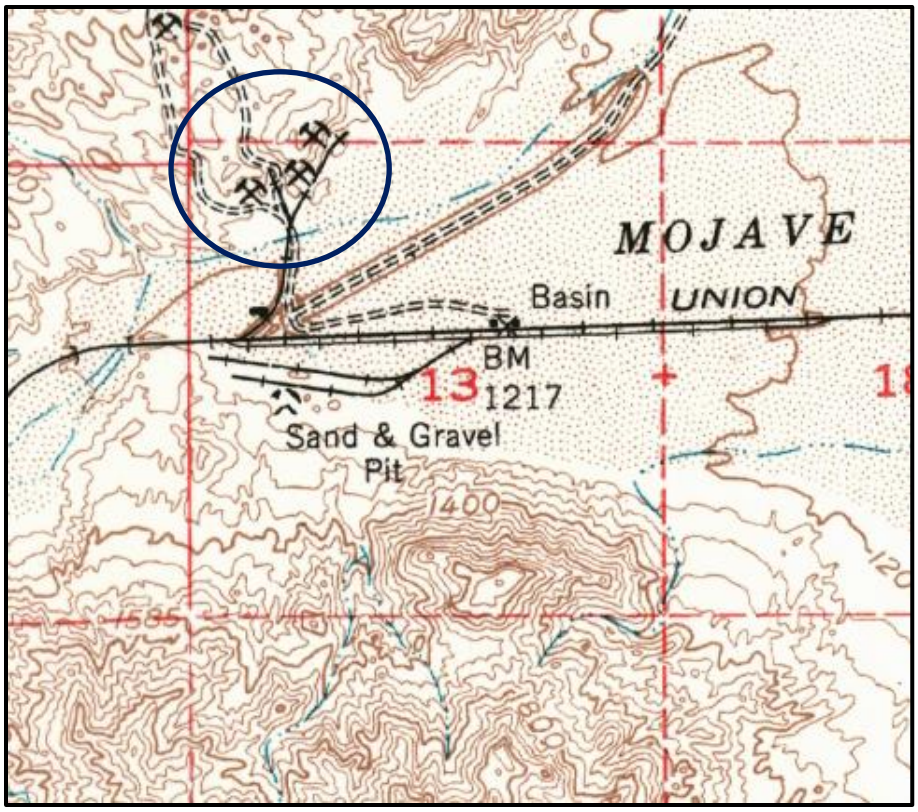

Figure 8. USGS Cave Mountain Quadrangle of 1948 (1:62,500).

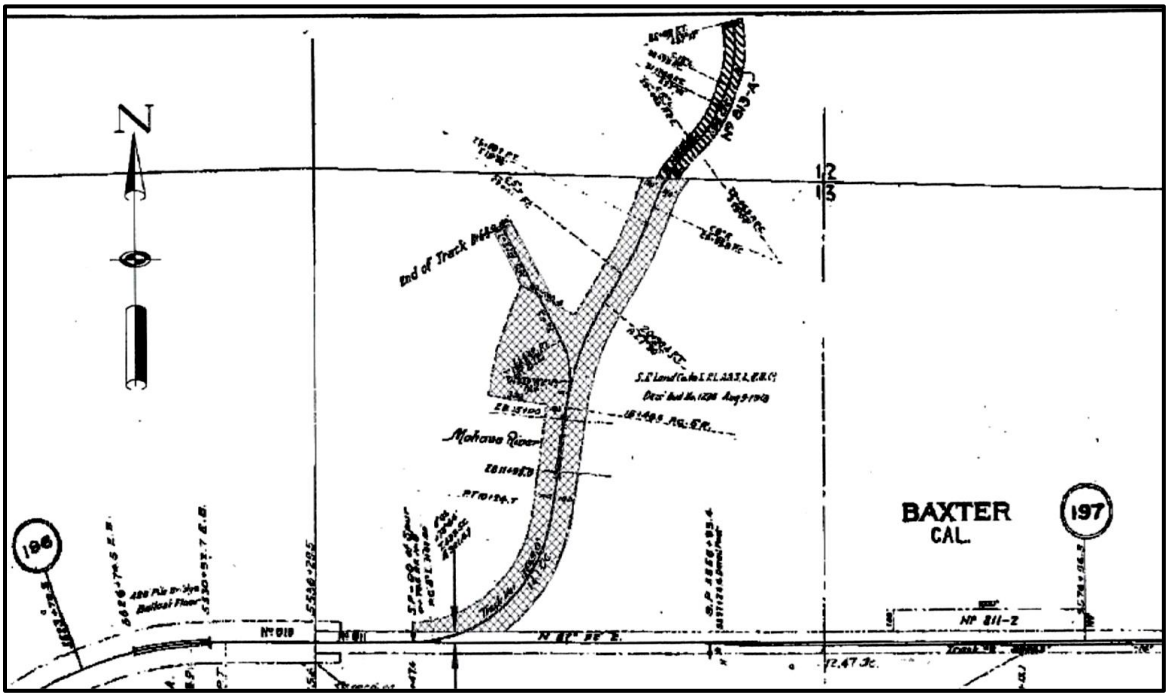

Figure 9. Map Presented in Crull (2008:17) Illustrating Spurs Associated with the Baxter Quarry Property.

The holding of the California Portland Cement Company were previously limited to Section 12 and a very small area in Section 7. Much later, the California Portland Cement Company claimed the Lillian Belle patents to the northeast of the original holdings and still in Section 12.

The primary areas of mining within the Cave Canyon complex were within the Cave Canyon Mine No. 1, Cave Canyon Lode, Vernon Mine, Hematite Mine, Rambler Mine, and Dahlberg Mine, with limited activities within the Emperor Mine and Calcium Mine. Expansion into surrounding claims, including the Wren Rock area, is currently being proposed.

METHODOLOGY

McKenna et al. completed this study in compliance with the Class III requirements for federal level compliance (Section 106); the standard requirements for compliance with CEQA, as amended; and in compliance with current County guidelines and policies. To adequately address these levels of investigation, McKenna et al. completed the following tasks:

1. Archaeological Records Search: A standard archaeological records search was completed through the California State University, Fullerton, South Central Coastal Information Center, Fullerton, California (Appendix B). This level of research provided information on the previous studies for the area (one mile radius), recorded sites, listed cultural resources, and the general sensitivity for the area to yield cultural resources. Historic maps were reviewed and the compiled information was used to place the project area within a context for an assessment of identified cultural resources.

2. Historic Background Research: Historic background was completed by reviewing historic maps and general histories for the area; Bureau of Land Management General Land Office records; County Assessor data; and a review of aerial photographs. McKenna et al. also reviewed the previous technical reports for the area and additional research into the various owners/operators of the mining claims. This information was also used to place the project area within a context to ascertain the extent of impacts to prehistoric and/or historic cultural resources. No standing structures have been reported for the study area, but evidence of prior construction may be identified within the expansion area, as indicated by previous reports and documentation – nearer Baxter siding.

3. Native American Consultation: McKenna et al. contacted the Native American Heritage Commission and inquired into the presence or absence of significant Native American resources in or near the project area (Appendix C). The Commission provided a listing of Native American representatives requesting notice of projects in this general area. Per current State

policies, guidelines, and laws, it is the responsibility of the County of San Bernardino to conduct government-to-government consultation with identified Native American representatives. Nonetheless, McKenna et al. sent letters to those individuals listed, along with a summary of the records search. Responses, if received, have been incorporated into the results of these studies and forwarded to the County via Lilburn Corporation.

4. Paleontological Overviews: McKenna et al. obtained a paleontological overview from the Natural History Museum of Los Angeles County (Appendix D). This review was used to access the potential for the paleontological specimens within the project area. The results are presented later in this report.

5. Field Research: McKenna et al. completed the field investigations of the proposed expansion area (280 acres) on June 2, 2019; June 16-19, 2019; and June 28, 2019. The fieldwork was conducted by Jeanette A. McKenna, M.A. and Principal Investigator for McKenna et al., with the assistance of and Michael A. McKenna (B.A. and J.D.).

   The field survey was designed to intensively survey all areas reasonably accessible via pedestrian survey; complete a reconnaissance survey of previously surveyed area and/or those areas of limited access; and avoid the steep slopes exceeding 45^{o}. As such, all peripheral areas was surveyed, leaving the central areas of the White Marble claims and Calcium claim inaccessible (excessively steep and dangerous). McKenna et al. estimated coverage to consist of approximately 180 acres of the total 280 acre expansion area.

   The surveyors carried a Garmin GPS system to document the locations of any identified resources, markers, etc. (notes on file, McKenna et al.) and maintained a complete photographic record (Appendix E).

6. Analysis: Analysis of the data included the assessment of sensitivity for the area to yield evidence of prehistoric or historic occupation and to determine whether or not any identified resources were potentially significant, as defined by the federal guidelines.

7. Report Preparation: This report has been completed for compliance with the Section 106 process, CEQA process, and County requirement, including all required data to assess potential significance of identified resources and/or impacts to cultural resources. The report has been prepared in a format consistent with the Class III requirements and also fulfills the requirements for documentation for State level compliance under the California Environmental Quality Act, as amended, and County of San Bernardino and the Office of Historic Preservation, Sacramento.

PREVIOUS RESEARCH

Previous research for the Baxter Quarry Expansion Area, and a one mile radius surrounding the project area, was completed at the California State University, Fullerton, South Central Coastal Information Center, Fullerton, California (Appendix B). This repository houses documentation (reports, site records, maps, etc.) pertaining to San Bernardino County, along with Los Angeles, Ventura, and Orange counties). This research was completed by Jeanette A. McKenna, Principal Investigator for McKenna et al., on June 18, 2019.

Research confirmed portions of the project area were previously investigated for cultural resources, but the majority of the acreage was not previously surveyed. Summarized in Table 3, a minimum of 25 studies have been identified within the project area or within a one mile radius of the project area. Of these, two involved portions of the current study area (1061953 and 1061220) and one (1062224) involve a general overview of the area of Cave Mountain. More specifically, study Hatheway and Duffield (1989) addressed an initial expansion of the Baxter Quarry property and involved two areas within the CalPortland holdings. Shepard (studies 1061220 and 1062224) addressed the general area including and surrounding Cave Mountain and resulted in the recording of trails and habitation sites. Many of these locations have not been verified or formally recorded. Overall, very little of the Baxter Quarry property has been examined for cultural resources.

As a result of the studies identified in Table 3, a number of cultural resources were identified and reported to the CSUF-SCCIC. Presented in Table 4, eight specific resources were identified. Two of the eight resources are “pending” sites and related to the Shepard studies. One Shepard locus is within the APE and on the eastern slope of Cave Mountain (south of the main access road).

None of the remaining six resources are within the project area, although P-=36-06306 is relatively close and within the area identified by Hatheway & Duffield as being within the Lillian Belle No. 2 mining claim. As mapped, this resource is actually near the northern boundary of the Monarch Mine claim and southeast of the Lillian Belle No. 2 claim. [The reference should have been “Lillian Belle Mill Site No. 2” – which is still outside the current APE.

Summarizing these findings, only one pending cultural resource has been identified within the current project area and one resource (P-36-06306) is peripheral. It is also noted, P-36-00560 is within the CalPortland holdings, but outside any area currently proposed for impacts.

Despite the limited resources identified within the CalPortland project area (and surrounding acreage), it is emphasized here, mining activities have been impacting this area of almost a century and there is ample historic research data to show the properties, especially in the area between the Baxter Siding on the Union Pacific Railroad and the Cave Mountain south-facing slopes, for resources associated with the early (pre-WWII) activities associated with the quarrying for the beet industry and the later CalPortland cement

Table 3. Studies Completed within One Mile of the Project Area.				
Ct.	NADB No.	Citation	Description	Resources
1	1060707	Brooks et al. 1978	Mojave Basin Planning Units	
2	1060754	Rogers 1929	Mojave Sink Region	
3	1060887	Warren 1980	Mojave Basin Planning Units	
4	1060888	Knack 1980	Amargosa-Mojave Basin	
5	1060889	Warren 1980	Amargosa-Mojave Basin	
6	1061170	Quinn 1981	Overview of Fort Irwin	Overview
7	1061219	Hall et al. 1981	SCE Ivanpah Facilities	Yes
8	1061220	Bean et al. 1982	Ivanpah Ethnographic Studies	Yes
9	1061361	Warren et al. 1983	Historic Preservation Plan for Fort Irwin	Planning Doc.
10	1061381	Musser & Sutton 1983	Barstow to Vegas Race Course	Yes
11	1061435	Duffield 1984	Mojave Road Survey	Yes
12	1061479	Dames & Moore 1985	Mead-Adelanto Trans. Line	Yes
13	1061563	Dean & Warren 1986	Fort Irwin Historic Preservation	Planning Doc.
14	1061753	Gilreath et al. 1987	Fort Irwin Inventory	Yes
15	1061834	Bouey & Hall 1988	Rasor OHV Area	Yes
16	1061953	Hatheway & Duffield 1989	Baxter Property	TBA
17	1061999	Drover 1979	Northern Mohave Sink	Yes
18	1062017	Jenkins 1982	Southern Paiute Subsistence	Overview
19	1062021	Jenkins 1984	Ceramic Research	Overview
20	1062022	Spinner & Ainsworth 1984	Biface Reduction Systems	Overview
21	1062220	Shepard 1981-1982-1983	Trail and Habitation Systems	Overview
22	1062224	Sheppard 1981 (p/o)	Mojave River Wash Survey	Overview
23	1062235	Mikkelsen & Hall 1990	Fort Irwin Land Expansion	Yes
24	1062280	Bamforth & Dorn 1988	Manix Lake Industry	Yes
25	1066167	Crull 2008	Cave Canyon Limestone Mine	Yes

Table 4. Cultural Resources Identified within One Mile of the Baxter Quarry Project Area, San Bernardino County, CA.				
Primary No.	Site No.	Citations	Description	Status
P-36-00540	CA-SBR-540	Hatheway & Duffield 1989 (and previously recorded)	Small, natural rock shelter with a single jasper flake	Outside current APE; SW ¼ Section 6
P-36-00669	CA-SBR-669	Bouey et al. 1988	Flake Scatter and Lithic Reduction Site (Quarry)	Outside of current APE; SW ¼ of Section 8
P-36-01910	CA-SBR-1910	Martinez and Mike 2013; Granger et al. 2012; Lange and Wilson 2010; Daly 2009; Harry Reid Center 2002; White 2001; Neuenschwander 1997; Becker 1991; Hanks 1976	Union Pacific Railroad R-O-W (various segments in San Bernardino County)	Outside of current APE
P-36-03033	CA-SBR-3033	Wedding 2001; Neuenschwander 1997; Bell et al. 1988; Casebier 1987; Hanks 1975; Ford 1968; James n.d.; OHP	Mojave Trail; Mojave Road	Outside of current APE
P-36-006306	CA-SBR-6306	Hatheway and Duffield 1989	Lithic Scatter; Historic Refuse	Associated with Lillian Belle No. 2; Section 12
P-36-10144H	CA-SBR-10144	James & Briggs 1999	Historic Refuse Scatter	Outside of current APE; South of Mojave River
PSBR-52	Pending	Shepard 1981-1982-1983	Trail System	Area wide resources
P-2044-11	Pending	Shepard 1982	Multiple Quarry/Habitation Sites	Area wide resources

manufacturing activities. Historic maps illustrate the presence of the railroad spurs and documents reference the presence of structures (mills, loading docks, etc.).

While there is no evidence of residential structures (these were at the Baxter siding), evidence of structural remains associated with the mining activities (e.g. offices, work-shops, storage facilities, etc.) is also highly possible.

RESULTS OF THE FIELD SURVEY

The current project area involves the existing CalPortland Baxter Quarry. The quarrying activity is on-going, but in a limited portion of the overall holdings. CalPortland proposes to expand their activities into area to the northeast, east, and south of the open quarry and into some areas that have been impacted by earlier quarrying activities. The main access road into the Baxter Quarry is located to the east/northeast of the property and associated with the Basin Road exit off Interstate 15. This alignment was used by McKenna et al. to access the project area. All survey areas were access on foot, with a vehicle left along the main access road.

The survey for the Baxter Quarry was completed over the course of multiple days, including: June 2, June 16 to 19, and June 28. The survey was completed by Jeanette A. McKenna, Principal Investigator for McKenna et al., with the assistance of M. Abraham McKenna. Six field days were expended.

On June 2, the area north of the access road and east of the main gate was initiated. This area was completed on June 16. Subsequently, between June 16 and 19, the areas south of the access road and west of the main gate were surveyed. It is noted, the higher elevations of Cave Mountain, where terrain exceeded 60^{o} slopes, were not surveyed (Figure 10).

The southwestern portion of the survey area was completed on June 28, including the areas associated with the railroad spurs. The survey area was irregular and, for the most part, was defined by the corners of identified mining claims. The pertinent corners defining the boundaries of the survey area are presented in Table 5.

As previously noted, only one cultural resource was mapped as being near the project area (P-36-006306). McKenna et al. attempted to relocate this site, using both the mapped location and corresponding UTM coordinates. The mapping appears to be accurate, given the UTM coordinates. This resource is outside the project area boundaries.

Regardless, McKenna et al. was unable to locate the site, as described (modern refuse with a sparse scatter of lithic tools. Given it has been over 30 years since the recording, it is possible this site has been inadvertently destroyed or possibly buried (being close to the road, there is a potential for dust and blow sand to cover the area). It is also quite possible sheet wash has impacted the resources.

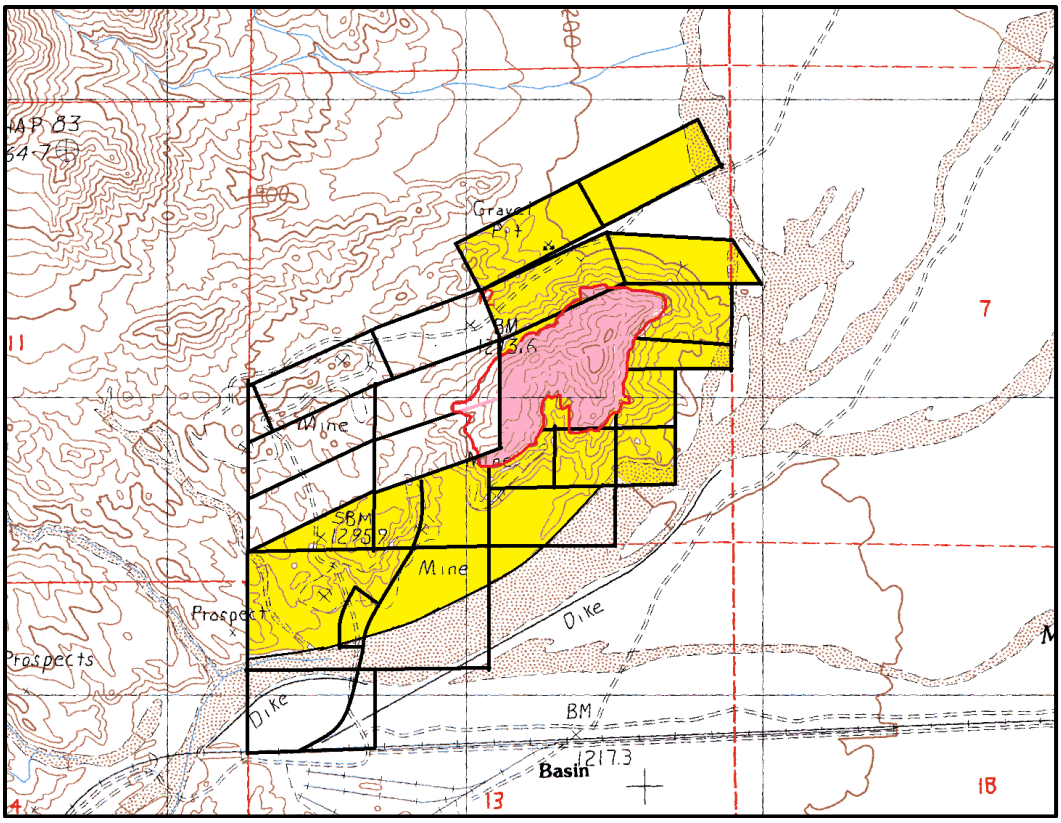

Figure 10. Surveyed Areas (yellow) and Avoided Areas (pink), Baxter Quarry.

Project Area Findings

As a result of the recent surveying, McKenna et al. has established the entire project area, as well as other components of the CalPortland property not included in the current project area, constitute a single site (cultural resource) with a number of internal isolated artifacts or features. These resources include, but are not necessarily limited to, the following:

- Isolated Flake (prehistoric)
- Dirt access road off Basin Road
- Existing open pit quarry
- Interior dirt roadways
- Earlier areas of quarrying
- Railroad spur berms
- Quarrying facilities (e.g. retaining walls, loading docks, roads)
- Foundations from pre-CalPortland activities (e.g. mills, crushers)
- Refuse scatters or isolated historic artifacts
- Claim markers (corner stakes or boundary markers)
- Modern camping areas (marked by rock rings/hearths)

Table 5. UTM Coordinates for the Project Area Boundaries.			
APN	Claim	NAD 27 (E/N)	NAD 83 (E/N)
0843-36-02	Monarch Mine (NE)	564874/3879522	564794/3879717
0843-36-02	Monarch Mine (NW)	564394/3879536	564314/3879731
0843-36-02	Monarch Mine (SE)	564970/3879358	564890/3879553
0843-36-03	Emperor Mine (SW)	564115/3879193	564035/3879388
0843-36-09	Calcium Mine (SW)	564107/3879000	564027/3879195
0843-36-09	Calcium Mine (SW)	564115/3878877	564035/3879072
0843-36-10	East End Mine (NE)	564894/3879335	564814/3879530
0843-36-11	White Marble No. 3 (NE)	564690/3879109	564610/3879304
0843-36-11	White Marble No. 3 (SE)	564878/3879109	564798/3879304
0843-36-12	White Marble No. 3 (SE)	564686/3879901	564606/3880096
0843-36-16	White Marble No. 1 (SW)	563268/3878479	563188/3878867
0843-36-18	White Marble No. 1 (NE)	564099/3878828	564019/3879023
0843-36-21	White Marble No. 2 (SE)	564484/3878511	564404/3878706
0843-36-21	White Marble No. 2 (SW)	564105/3878899	564025/3879094
0843-36-22	Evening Star Mine (SE)	564672/3878721	564592/3878916
0843-36-22	Evening Star Mine (SW)	564464/3878709	564384/3878904
0843-36-24	Rock Wren Nos. 1 and 2 (SE)	564087/3878081	564007/3878276
0843-36-24	Rock Wren Nos. 1 and 2 (SW_1)	563266/3878029	563186/3878224
0843-36-24	Rock Wren Nos. 1 and 2 (SW_2)	563685/3878021	563605/3878216
0843-36-24	Rock Wren Nos. 1 and 2 (NE)	564107/3878499	564027/3878694
0843-36-35	Lillian Belle No. 2 (NW)	563963/3879520	563883/3879715
0843-36-35	Lillian Belle No. 2 (SW)	564067/3879371	563987/3879566
0843-36-36	Lillian Belle No. 3 (NE)	564777/3879957	564697/3880152
0843-36-36	Lillian Belle No. 3 (SE)	564839/3879779	564759/3879974

Isolated Flake

An isolated prehistoric flake was recovered from the project area. Illustrated in Figure 11, this flake was identified as a weather worn/water worn jasper flake with some evidence of edge wear. This artifact was recovered from an area on the south side of Cave Mountain and within an area of sheet wash (NAD 27 UTMs 564407E/3878629N) and is indicative of the potential to yield evidence of prehistoric use of the area. It measures 4.5cm x 3.2cm x .9cm. This artifact represents the only artifact of prehistoric origin in the area. It is emphasized, however, being in an area of sheet wash and moving sands, the potential buried resources, even in shallow contexts, is possible. This artifact is being temporarily curated at the of-

Figure 11. Jasper Flake.

fices of McKenna et al. and will be forwarded to the San Bernardino Co. Museum upon completion of this project.

Access Road off Basin Road

This access road cuts away from Basin Road in the northeastern quarter of Section 6 (T 11 N; R 7 E). Historic maps illustrate Basin Road as being established prior to 1933, but the cut-off to the Baxter Quarry was not evident until the mapping of 1948 and under the ownership of CalPortland. This suggests the eastern access road was established by CalPortland and earlier access route was more directly associated with the Baxter Siding and access roads south of the Mojave River.

As a pre-1948 road (still a dirt access road), this alignment qualifies as a feature associated with the Baxter Quarry (CalPortland) property. This road enters the project area near the southwestern corner of the Lillian Belle No. 3 claim (southeastern corner of the Lillian Belle No. 2 claim). The gated entrance (Figure 12) to the quarry was located at NAD 27 UTMs 564214E/3879177N. This road has been periodically graded and subjected to minor realignments over the past 70 + years.

Figure 12. Access Gate to the CalPortland Property – West Fork of Basin Road (facing East/Northeast).

Open Pit Quarry:

The existing open pit quarry operated by Cal Portland involves six claims, including: the Cave Canyon Lode (M.S. 4235); Cave Canyon Mine No. 1 M.S. 4238); Hematite Mine (M.S. 4604); Vernon Mine (M.S. 4604); Rambler Mine (M.S. 4604) and Dahlberg Mine (M.S. 4604). Other areas of earlier mining and exhibiting impacts, but not on-going mining activities, include: the Emperor Mine (M.S. 4241); Monarch Mine (M.S. 4240); White Marble No. 1 (G.L. 11 and G.L. 12); and Rock Wren Nos. 1 and 2.

As highly disturbed areas, much of this acreage was not surveyed and/or did not require surveying (the majority of the open-pit quarry is not included in the current study area and other areas were generally peripheral; Figures 13 and 14). Those areas that were surveyed yielded additional evidence of the early activities, as discussed below.

Interior Dirt Roads:

There were a number of dirt access roads identified within the survey area. In some cases, these roads were readily identifiable as roads related to the mining activities. In others, the roads appeared in areas that were more directly associated with the modern recreational activities. Because they were all dirt roads and in various degrees of use or non-use, their relative locations were marked by NAD 27 UTMs at various points. These UTM coordinates include the following:

Access Road	564867/3879463	Dirt Road	564389/3878627
Intersection	564892/3879368	Dirt Road	564366/3878618
Dirt Road	564498/3878690		

Additional points along these roads were marked when photographs were taken. No artifacts were identified within the roadways, but cairns and hearths were identified along the peripheries of the roads, indicating they were used for access to mining claims, but also used to access camping sites (Figures 15 and 16). The cairns, in some cases, were identified as mining claim markers or property boundary markers.

Railroad Spur Berms:

The railroad spur berms are still present and identifiable, but certainly impacted. The rails have been removed, as have most of the ties, but the berms (benches), some rock retaining walls, and evidence of reinforcement elements are still evident. The rock walls are present in locations where roads for trucks provide access to the spur line and the trucks, being at a higher elevation, can then load the waiting rail cars with the ore from the active mines. Later, when the spur was no longer in use, tailings were deposited in the general area, burying portions of the spur alignment and rendering the access roads unusable.

Figure 13. Example of Existing Mining Operations at the Baxter Quarry Site.

Figure 14. Example of Earlier Mining Activities South of the Current Operations.

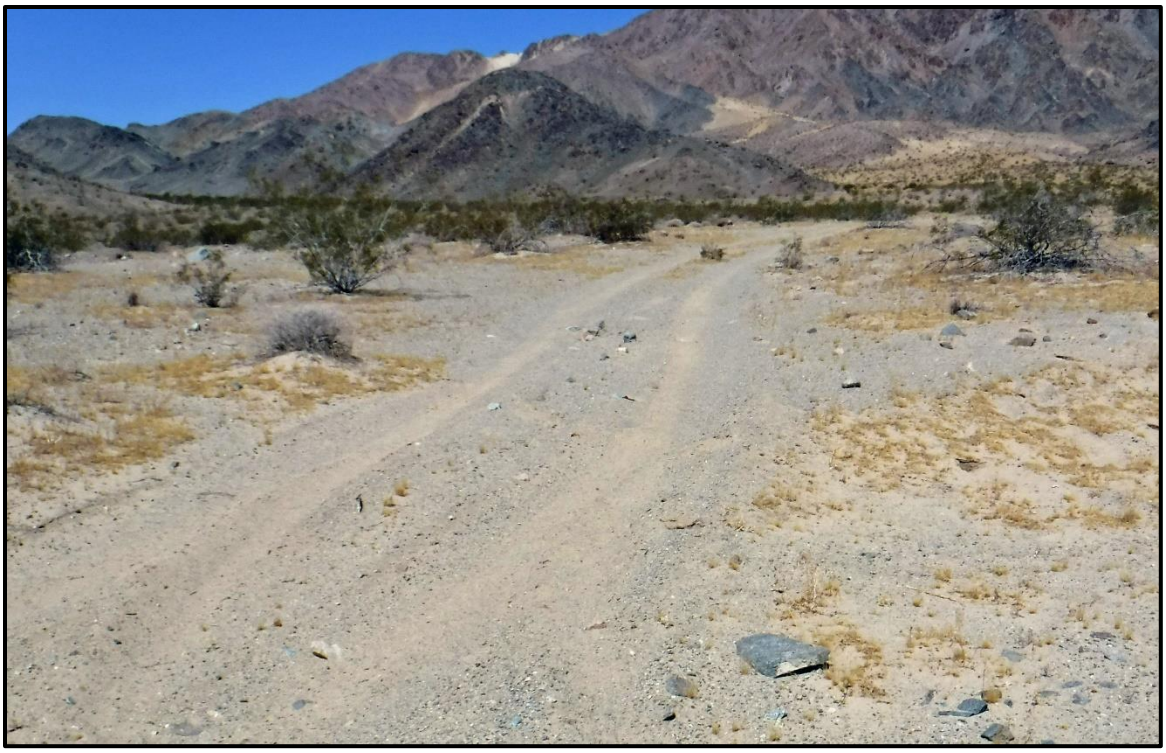

Figure 15. An Example of the Dirt Roads Identified within the Project Area (this road being northeast of the main access gate).

Figure 16. An Example of the Modern Hearths Located within the Project Area.

Illustrated in Figure 17, the area of the railroad spur alignment is still visible. This alignment has not bee in use in recent yeas and likely has not been used since the 1960s. The spur alignment is currently buried, in part, by tailings and remains of the pre-1938 processing facilities associated with the sugar beet industrial excavations can be found nearby.

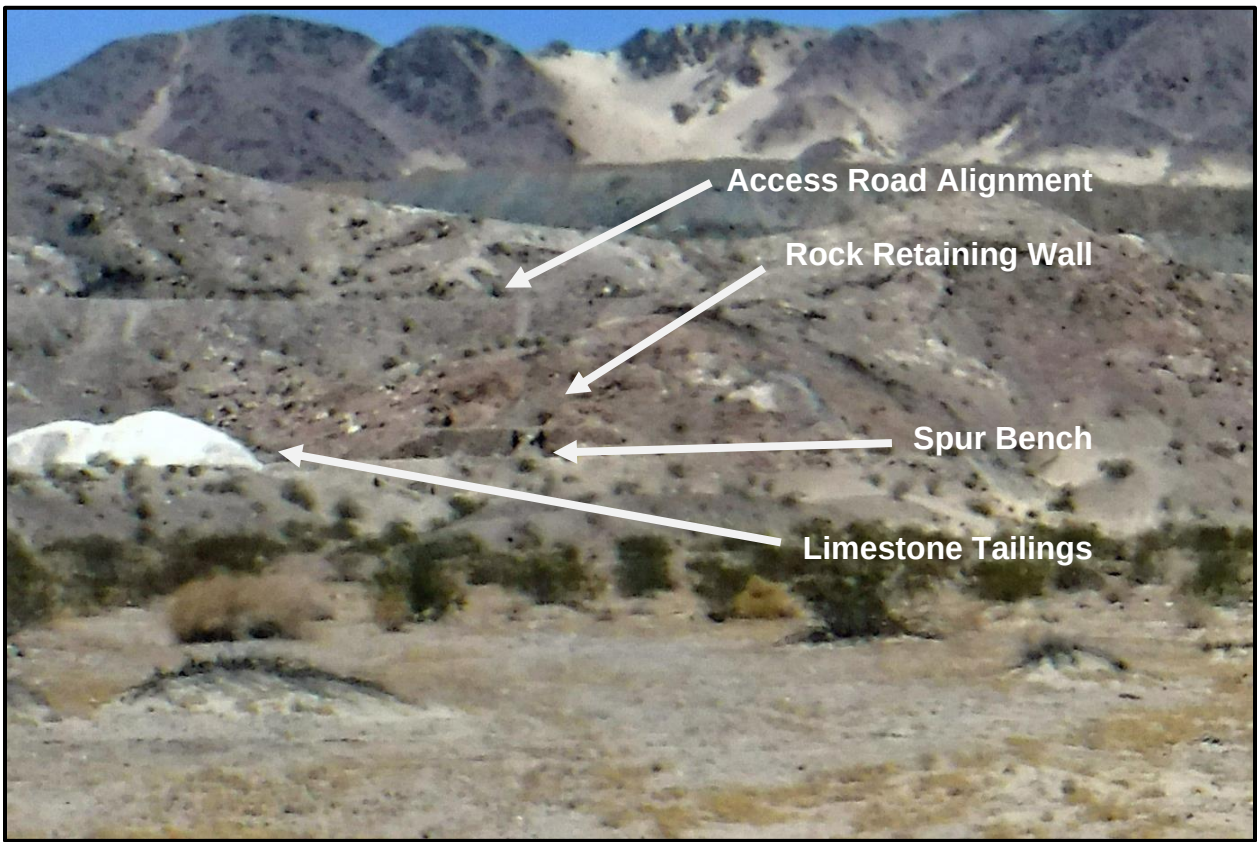

Figure 17. Area of Old Railroad Spur and Associated Rock Walls and Tailings.

Quarrying Facilities (e.g. foundations/structural remains)

With the exception of the few modern facilities associated with the CalPortland operations, the only physical evidence (save the actual quarry areas) of earlier mining was identified within the boundaries of the Rock Wren No. 2 Placer Mine (Parcel 24). These remains were found east of the railroad spur alignment, south of the quarry(ies), and north of the Mojave River and associated dyke. A very sparse scatter of debris (mainly small glass fragments and nails) was identified along with three locations of structural remains. All three consisted of foundations and/or associated footings associated with the facilities established during the sugar beet lease of the nearby mines. As previously noted, between ca. 1915 and ca. 1924, the mines were leased by a consortium of sugar companies to extract limestone. In ca. 1924-1925, operations shifted to the Pacific Marble Companies. In 1925, Pacific Marble Companies established of two upright lime kilns and a small

hydrated lime plant on the south side of Cave Mountain, with access to the nearby railroad siding and access over the Mojave River via the bridge built by the sugar companies.

McKenna et al., identified three foundations consistent with these three reported improvements. The first foundation was identified at NAD 27 UTMs 563903E/3878514N (Figure 18) and consisted of a formed concrete foundation with a series of post supports identified on the southeast side of the foundation. The foundation, itself, is partially buried by washed in soils and a mound of limestone debris deposited atop part of the foundation (Figure 18). The exposed areas suggest a structure measuring twenty feet (20) by at least ten feet (10). Post supports (6) run the length of the foundation, suggesting these were also for wall-framing. The interior of the foundations exhibits a poured concrete floor that is a noticeably late addition to the earlier foundation. Two equipment mounts are within the foundation, indicating the structure served as the location of equipment requiring protection from the elements and possibly, secondarily, also provided some small, on-site office space.

Figure 18. Foundation Identified within the Baxter Quarry Project Area.

Southeast of this foundation are additional post supports (roughly poured concrete squares) – four extending from the northeastern corner of the foundation and another nine extending from the southeastern side of the foundation and paralleling the four northeast of the foundation. This configuration indicates the presence of an elongated ramada-like structure fronting the structure and extending further to the north. Located in an area without a prepared floor, this appears to have been an covered, albeit outdoor use area for miscellaneous chores within the complex or possibly a covered area for the crew to take rests out of the heat. In either case, the few items in the area failed to provide any evidence to confirm the use of this area.

The second foundation is associated with concrete footings and consists of an elongated expanse of poured concrete with the two large footings on either end (Figure 19). This feature was identified at NAD 27 UTMs 563966E/3878557N. McKenna et al. has correlated with foundation with the two lime kilns constructed in ca. 1925.

Figure 19. Large Concrete Slab Foundation with Equipment Footings.

The concrete slab foundation is roughly poured and in very poor condition. The two equipment footings were roughly poured into wood-framed boxes (approximately 30" tall) with a series of twelve large anchor bolts each. These two kilns were dismantled and relocated when the activities of the Pacific Marble Company ended its operations at the site. Only the foundation remains.

The last foundation with identified at NAD 27 UTMs 564197E/3878654N and consists of a large concrete slab foundation equated with the lime hydrated lime plant (Figure 20). This pad was constructed by placing a series of heavy beams above the natural soils and pouring of the concrete atop these beams (for extra support). The concrete was poured in segments and, as a result, as the foundation settled – and over time – these segments broke and separated. Subsequently, when rain water fell onto this foundation, the segments separated further. At present, there is no evidence of any hydrated lime plant remains and virtually no evidence of significant artifacts, only some nails and fragments of the rotting wood. A visual inspection of this foundation failed to yield any evidence of markings, incising, or scarring to provide additional data.

Figure 20. Elongated Foundation Associated with the Hydrated Lime Plant, ca. 1926.

Refuse Scatters/Isolated Artifacts

As previously noted, there is a very sparse scatter of historic refuse and artifacts throughout the project area. These items are dominated by the presence of modern refuse associated with hearths and camping areas surrounding Cave Mountain and near the various access roads within the property. In the general area of the lime kilns, there is a scatter of nails and glass, along with some wooden debris.

Nearer the Mojave River and the sheet wash areas feeding the river are some large, displaced wooden beams – not utility poles, but squared beams that were likely associated with the mining activities. Given their locations, the did not wash from the kiln work area, but may have been discarded elsewhere and washed towards the dyke. None of these items have been identified as significant. None add to the understanding of the area.

Wood Debris

One large wooden beam was identified as NAD 27 UTMs 564826E/3878938N. This area is outside the actual project area, but visible from the project area (near the southeastern corner of Cave Mountain. There were no identifying marks on the wood to indicate its purpose. The proposed expansion of the mining activities will not impact this debris.

Claim Markers

Claim Markers were identified throughout the project area (Figure 21). Notable markers were identified at the following NAD 27 UTM locations:

Unmarked Wooden Stake	564291E/3879539N
Concrete Block “5-5-72 BI-38 B-J”	564322E/3879602N
Concrete Marker “6-5-74 JB”	564350E/3879615N
“BI-28 B-J”	564352E/3879617N
Rock Cairn near Road	564410E/3879626N
Marker “B-56”	564392E/3879643N
Stake “Direct …”	563860E/3879653N
Marker “JB BI-41 4-19-73”	564429E/3879666N
“BI-40 4-18-…”	564456E/3879680N
“B-27 BJ”	564502E/3879690N
Unmarked Post	564525E/3879712N
Concrete Marker “BI-38 … NE ¼ #2”	564525E/3878712N
Cairn/Post “East Center Lillian Belle #5”	564170E/3879963N
Unmarked Cairn	564892E/3879511N
Disturbed Marker/Cairn	564889E/3879228N
Old Rock Ring (possible marker)	564688E/3878828N
Cairn and Post	564274E/3878511N
Cairn at Crossroads	564203E/3878470N
Cairn	563974E/3878474N
Stake - U.S. Mineral Survey #838 “1975 LBM #1, Corner #3”	564452E/3879537N

Figure 21. An Example of a Disturbed Cairn (with burned post).

The majority of these markers were identified to the northeast of the main gate and in the areas associated with the Lillian Belle claims. Others were identified around the base of Cave Mountain. Some of the cairns may have been claim markers, but had no identifying information. Other markers appeared to be landmarks denoting road intersections. Few yielded specific data and were disturbed by modern activities, such as dismantling the cairns to use the rocks in the modern camping hearths. They have been noted, photographed and recorded as part of this larger site area, but are not considered significant historical features.

Modern Features

For the most part, the extent of modern features involve those related to camping and or recreational activities east and south of Cave Mountain (Figure 22). During the survey, McKenna et al. identified a number of modern hearths, areas of recent camping, and evidence of skeet shooting and off-road vehicular activities.

Figure 22. Modern Camping Debris within the Project Area (near gated entrance).

The features identified in relation to these activities were identified at the following locations:

Camping Area and Modern Hearth	564279E/3879478N
Camping Debris	564263E/3879554N
Dirt Road Cut	564510E/3879711N
Campsite with Rock Cairn	564170E/3879963N

Dirt Road Intersection	564622E/3879635N
AC8712 Route Signage	564857E/3879811N
Camping Hearth	564764E/3879040N
Old Rock Ring (possible marker)	564688E/3878828N
Hearth	564574E/3878766N

None of these features is considered to be historically significant, but their presence is indicative of the on-going recreational uses of this general area and the need to insure mining activities do not intrude upon available camping areas with campers will need to be kept from the actual mining activities.

Dirt Animal Trail on Desert Pavement

Previous research resulted in the identification of trails/paths recorded in various areas of Cave Mountain. In 1981-1983, Shepard conducted a study of resources in the vicinities of the Cady Mountains and Cave Mountain. His research resulted in the identification of possible trail/path locations tentatively identified as prehistoric trails. During the recent survey of the Baxter Quarry, McKenna et al. identified a trail at NAD 27 UTMs 564351E/ 3878676N (Figure 23). This trail was identified along a ridgetop on the south side of Cave Mountain and relatively close to some of the older mining activities. In following this trail, McKenna et al. noted the presence of some scant modern refuse (juice containers with straws) and animal scat. No evidence of prehistoric artifacts was found and no evidence to suggest this trail is anything other than an animal trail on the desert pavement defining the crest of this ridge.

Figure 23. Segment of Trail Identified on Ridge, Southern Side of Cave Mountain.

Obviously, there is always a potential for this trail to be associated with human activity and not animals (or both). However, without a context to definitively associate it with human activity, McKenna et al. is designating it an animal trail and of no identified significance. It has been recorded and, should additional data be developed at some later date, this designation can and should be revised.

CONCLUSIONS AND RECOMMENDATIONS

In completing this study, McKenna et al. conducted a paleontological overview, Native American consultation, historic background research, and the field survey. As a result, the following conclusions are presented:

Paleontological Overview

The paleontological overview prepared by McLeod (2019) confirmed the project area to consist primarily of metamorphic bedrock not consistent with the presence of fossil specimens. The lower elevations associated with the Mojave River and associated sheet wash areas (primarily at the base of Cave Mountain) consist of younger Quaternary alluvium derived from the nearby fans and fluvial deposits of the River. These deposits are also considered inconsistent with the presence of fossil specimens. The younger alluvium overlays deeper, older alluvial deposits that may yield fossil specimens. However, as designed, the proposed project will not involve excavations into the older Quaternary deposits and, therefore, the project will not result in any adverse environmental impacts with respect to paleontological resources. No further studies are warranted at this time.

Native American Consultation

McKenna et al. consulted with the Native American Heritage Commission regarding the presence/absence of sacred or religious sites within the vicinity of the Baxter Quarry project area. The Commission reported negative findings with respect to their files and recommended consultation with locally recognized representatives of the Native American community for addition feedback.

McKenna et al. left the government-to-government consultation between San Bernardino County staff and the Native American community to the County, per standard policy of the County. Data compiled by the County can be used to supplement this initial level of consultation.

Native American/Prehistoric Archaeological Resources

As a result of the recent investigations of the Baxter Quarry expansion project area, McKenna et al. concluded there was a single, identifiable prehistoric isolate (jasper flake) found within the project area boundaries. This artifact was recovered and will be curated.

One previously recorded lithic scatter was not relocated during the studies, but may be present in a buried context, as it is/was reported to be in an area of sheet wash. Although no additional evidence of prehistoric uses of the area was identified, the area is still considered to be moderately sensitive for additional resources, as there are known resources within one mile of the project area.

Historic Mining Resources

With respect to historic-period resources, McKenna et al. has concluded the entire project area constitutes one large site – generically referred to as the Baxter Quarry site, but also considered to be part of the area associated with the Harriman's Iron Chief claims and, at a short distance, the Baxter Siding recorded by Crull (P-36-03533H; originally reported in 1978). McKenna et al. has opted to use the preciously recorded Primary Number while updating the recordation of the Baxter Quarry, given the quarry and the siding are historically associated with each other.

The results of the investigations confirmed the presence of earlier quarrying activities, including the presence of mining claim markers (cairns, posts, etc.); open pits; some evidence of tunnels; access roads; the early railroad spur; and remnants of the 1925-1926 facility established by the Pacific Marble Company. There is a sparse scatter of glass and nails throughout the area associated with the line kilns and hydrated line plant (these facilities have been dismantled). Features associated with the railroad spur include access roads, reinforced retaining rock walls, and ore loading chutes – all in various states of disrepair.

Despite the extent of the resources identified within the project area, it is noted the more substantial features cluster on the south side of Cave Mountain, between the quarry pits and the Mojave River. None of these features are intact, but they have been recorded. They are not considered to be significant historic resources and there does not appear to be any potential for additional data should they be subjected to further study. They have been recorded and an updated site form has been prepared to complete the documentation.

Formal Resource Evaluations

In formally assessing the significance of the resources identified within the project area, McKenna et al. applied the federal, state, and county policies and guidelines, asking and answering the follows:

1. Is/are the resources associated with events that have made a significant contribution to the broad patterns of our history?

   In general, it can be argued that mining in the California Desert has had a significant impact on the success of many individuals and industries. How-

ever, in this case, the mining operations at the Baxter Quarry have always been sporadic and relatively limited. They emphasized the quarrying of limestone, not precious metals, and were directed towards industrial and commercial material uses, not on the level or with the impact more substantial materials would have had on the region, state, or nation. McKenna et al. has concluded the intent of this criterion has not been met and, therefore, the Baxter Quarry is not a significant resource under Criterion A.

2. Is/are the resources associated with the lives of persons significant in our past?

   The initial identification of the claims associated with the Baxter Quarry were filed by a number of individuals with small, unimproved claims. These claims were eventually sold, as a group, to “bigger players” with plans to initiate true mining activities and, hopefully, have a successful venture. One such owner was Alfred Merritt of Minnesota. Merritt never initiated his mining, as he lacked the connection with the local railroad alignment. Having failed to convince Harriman to establish the siding and spur needed for successful mining, Merritt sold the claims to Harriman and Harriman planned the development of the mines. Harriman, too, opted not to develop the mines, but leased the claims to others, who completed various phases of improvements. None of the mining activities could be specifically associated with any individual or company meeting the requirements and intent of Criterion B and, even with the 1938-present ownership by CalPortland, McKenna et al. has concluded the property is not a historically significant resource under Criterion B.

3. Do the resources embody the distinctive characteristics of a type, period, region or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual distinction?

   This particular criterion was designed to be applied to standing structures. In this case, there are no standing structures within the project area. The historic features are archaeological resources and addressed below. With no standing structures, this criterion is not applicable to this study. McKenna et al. has concluded Criterion C is not applicable.

4. Have the resources/study area yielded, or likely to yield, information important to history or prehistory?

   The potential for the archaeological resources within the project area to yield “information important to history or prehistory” has been determined to unfounded. Only one prehistoric isolate have been identified (and recovered). This single, isolated artifact is, by definition, insignificant. Its present is not significant and its recovery has resulted in the protection of the re-

source for future study, If warranted. This resource has been recorded as an isolated prehistoric artifact recovered from within the larger historic archaeological site (P-36-03533H).

The historic resources within the project area have been recorded, photographed, and defined by their association with the post-1925 mining activities. Their does not appear to be any potential for additional research, as the activities, associations, and extent of the resources has been documented. McKenna et al. is recommending no further studies at this time. Overall, the intent of the criterion has not been met and, therefore, McKenna et al. has concluded the mining site is not significant under Criterion D.

Recommendations

McKenna et al. making the following recommendations based on the data presented in this document and the conclusions that the project area is not a historically significant cultural resource.

1. The project area is not sensitive for paleontological resources. However, on the oft chance that paleontological specimens are uncovered within the project area and as a result of the quarry expansion, the proponent should contact a professional paleontological consultant and permit the consultant to assess the significance of the find and manage the find in accordance with the policies and guidelines of the San Bernardino County Department of Earth Sciences.

2. The Native American Heritage Commission Sacred Land Files yielded negative results, suggesting the project area is not sensitive for such resources. However, the County, in conducting their government-to-government consultation, may be in possession of additional data that should be incorporated into the decision-making process. Native American comments and concerns should be incorporated into the overall cultural resources discussions and recommendations finalized and approved by the County.

3. Only one prehistoric artifact was identified within the project area, but others have been recorded within one mile of the project area. This, and the fact that the Mojave River is adjacent to the project area, suggests the project area may still be sensitive for additional prehistoric resources. McKenna et al. recommends the proponent of the project be aware of this fair to moderate level of sensitivity and have an archaeological consultant on-call to address any unanticipated find(s) and to complete periodic spot checks within the project area when activities involve areas of sensitivity – specifically in areas not dominated by bedrock and more directly associated with the younger alluvial deposits along the base of Cave Mountain.

4. If, at any time, human remains (or potentially human remains) are identified, the County Coroner and archaeological consultant should be contacted immediately. The Coroner must be contacted within 24 hours of the find and the find must be avoided, including a buffer of no less than 100 feet, until the Coroner has assessed the remains. If the remains are determined to be of Native American origin, the Coroner will contact the Native American Heritage Commission and the Most Likely Descendant (MLD) will be named. In consultation with the MLD, County, Proponent, and consulting archaeological, the disposition of the remains will be determined. If a consensus cannot be reached, the Commission will make the final decision.

   If the remains are of forensic value, the Coroner will take possess and manage the remains in a manner consistent with current policies. If the remains are archaeological, but not Native American, they will be handled by the consulting archaeologist in a manner consistent with current profession policies and guidelines. Costs for the management of prehistoric or historic remains will be the responsibility of the project proponent.

The recommendations presented above reflect the professional recommendations of McKenna et al. The staff for San Bernardino County may add conditions to the project approvals, as deemed applicable, given additional data on the project not necessarily available to the consulting archaeologist at the tie of this writing. Should the proposed project area be enlarged, additional studies will be warranted and current recommendations may be amended.

CERTIFICATION

CERTIFICATION. I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this archaeological report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

Oct. 17, 2019 — Jeanette A. McKenna

Date — Jeanette A. McKenna, Principal Investigator, McKenna et al.

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