5 CULTURAL RESOURCES AND LAND USE

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### INTRODUCTION

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Preceding page: Casebier's Rock, the most striking example of Indian rock art in the Granites. Photo by J. Kerbavaz.
INTRODUCTION

The Cultural Resources and Land Use section of the Granite Mountains Resource Survey includes information on all aspects of human use of the area from the time of the earliest aboriginal occupation to the present. The impact of these uses has been light; much of the range is still in a pristine state. Evidence of the early inhabitants of the Granite Mountains—The Desert Mohaves* and the Chemehuevis—can be found in a substantial archaeological record dating from 10,000 years ago to historic times. About 96 archaeological sites have been recorded in the area.

Some of the early explorers in the area kept journals during their travels; these journals, together with reports of military actions against the desert Indians, provide the first written records of the eastern Mojave. The Granite Mountains were not on the main routes of travel, and were not mentioned in written accounts until 1860.

Prospectors ranged throughout the eastern Mojave Desert during the late 1800s and early 1900s; they converted many Indian trails into wagon roads, opening formerly inaccessible areas. Livestock have grazed in the eastern Mojave since the early 1800s.

Both grazing and mining have affected the Granite Mountains. Mining has been conducted on a small scale since at least the early 1900s; shafts, tunnels, and tailings can be seen in several locations in the range. Several mining claims are still current. Cattle are presently grazed in the area; long-term grazing has probably affected the native flora and fauna. Feral burros, introduced by miners, roam the Granites as well.

Settlement in the Granite Mountains has been quite limited; only two parcels of land are privately owned as homesites.

The Granite Mountains offer prime opportunities for recreation, research, and education. Recreational use can be expected to increase in

*By convention, Mohave with an "h" is used when describing the Indian tribe and the Indian trail across the eastern Mojave Desert. Mojave with a "j" is used when describing the Desert, the River, the Wagon Road, and the Fort at Beale's Crossing (Casebier 1975).
the near future, as the population of California and the public appreciation of desert areas continue to grow. At present, major decisions are being made regarding the future status of the Granite Mountains. The University of California Natural Land and Water Reserves System has recently purchased three sections of land for use as a scientific research and education reserve. Also, under the Federal Land Policy and Management Act of 1976, all Bureau of Land Management (BLM) lands are being reviewed for potential wilderness designation. Documents released by BLM recommend that most of the Granite Mountains be designated a Wilderness Study Area, and that the central Cottonwood Basin area be designated a Research Natural Area (RNA). The proposed RNA would be managed by the BLM in cooperation with the University of California Natural Land and Water Reserves System.

The unique cultural and natural resources of the Granite Mountains deserve protection. Careful planning and an understanding of human influences on the land are necessary for wise management in the future.
ARCHAEOLOGY

According to the creation myth told by the Chemehuevi, native people who lived in the Granite Mountains, humans resulted from the union of Coyote and Louse. Coyote carried Louse's fertilized eggs from her house across the sea to his home in the snowy mountains. He disobeyed the instructions of Louse's mother and opened the basket of eggs before reaching home; people poured out and scattered over all the earth. Coyote brought the few weaklings and cripples left in the basket to his brother, Wolf, who re-made these into the best of all people—the Chemehuevi.

Archaeologists and anthropologists describe the occupation of the desert area in a different manner. Most do not speculate about the ultimate origin of the Chemehuevi, but many have been working to establish a cultural sequence for the desert, tracing the cultures that inhabited the region before the Chemehuevi.

**Cultural Sequence of the Mojave Desert**

The archaeological record shows signs of humans living in the California desert 12,000 years ago, and researchers have evidence that humans may have lived in the area 50,000 to 80,000 years ago (Stebbins et al. 1978). Some of the earliest noted sites, Malpais or Pre-projectile Point occupations, occur adjacent to the East Mojave area. Archaeologists currently debate the dating and definition of some of these early assemblages (King and Casebier 1976).

The earliest generally accepted cultural period in the Mojave area is the San Dieguito-Playa complex, habitations on beaches around basins that were lakes in the Pleistocene. The most important lake was Lake Mojave, which filled the basins of Soda and Silver dry lakes. Archaeologists estimate that the San Dieguito association existed from approximately 10,000 years ago until the beginning of the Desert Cultures about 5 to 6000 years ago (Weaver 1977). Christopher Donnan (1964) postulated that tools found at Colton Wells and points found at Rustler Rockshelter in the Providence
Mountains may show occupation of the area during that period. Chester King (King and Casebier 1976) noted that there are no known settlements from this period in the BLM East Mojave Planning Unit, but that Lake Mojave hunters probably entered the area to hunt deer and mountain sheep. Michael Kuhn (pers.comm. 1978) found a tool in the Granites that he believes dates from this period, indicating that humans may have entered into the Granites at least some 9000 to 10,000 years ago.

Researchers describe the subsequent period, the Pinto Period, as lasting from 5000 to 2000 B.C. (Weaver 1977). King (King and Casebier 1976) wrote that only one site in the East Mojave Planning Unit, the Marl Lake site, "can presently be demonstrated as resulting from occupations dating between 5500 to 500 B.C." Pinto sites are identified by a characteristic Pinto point; assemblages suggest a highly mobile culture of desert hunters and gatherers (Weaver 1977). Davis (1962) reported one point of the Pinto type in the Rustler Rockshelter. Michael Kuhn (pers.comm. 1978) found artifacts in the Granites that he believes could date from this period, possibly indicating some use of the Granite Mountains area 4000 to 5000 years ago.

Malcolm Rogers called the next period (roughly corresponding with the Middle Period of central California) the Amargosa, and divided it into two phases. Weaver (1977) dated the period at 2000 B.C. to A.D. 500. The Amargosa marked the beginning of increased use of the mountainous areas and highland springs. The greater frequency of grinding implements in this period suggests increased seed gathering. Some authors (Donnan 1964) feel that these shifts were the result of changing climate and increased aridity. King (King and Casebier 1976) theorized that a changing social system that evolved to allow societies to maintain centralized food stores controlled by chiefs, gave people the opportunity to use unreliable food sources and live in previously unpopulated areas. Davis (1962) noted artifacts from the Amargosa I time period in the Providence Mountains.

The Amargosa II phase marks the introduction of pottery into the area.
Malcolm Rogers never gave specific dates for these phases; King (King and Casebier 1976) suggested a date for the second phase of about A.D. 500 to 700. Rogers termed the Amargosa II phase the time of the shift to the use of high mountain springs. King described the total period from about 500 B.C. on as the period of increased occupation of the eastern Mojave Desert. It is probable that this increased occupation may have included the Granite Mountains area.

Rogers called the next period Yuman and divided it into three phases. Yuman I began about A.D. 600 to 700 and was called a Pre-pottery Yuman Component in the Mojave Desert. According to Donnan (1964) the lowest levels of the Rustler Rockshelter in the Providence Mountains seem to correspond to this phase.

The Yuman II phase (A.D. 1050-1450) was characterized by the spread of ceramic technology into the desert. Davis (1962) found Yuman II pottery in Rustler Rockshelter. The Cottonwood Triangular/Desert Side-Notched point series appeared during the later portion of the phase, about A.D. 1300 (Weaver 1977).

Within the eastern Mojave Desert, Rogers's Yuman III phase, commencing about A.D. 1450, is contemporary with the Chemehuevi occupation, and thus is labeled the Chemehuevi Time Period. Rogers noted a shift in pottery and point types corresponding to this change from Yuman II to Chemehuevi occupation (King and Casebier 1976).

Tracing the cultures that occupied the East Mojave, Chester King (King and Casebier 1976) felt that peoples belonging to three different language families occupied the region during the last 3000 years. North of the area, in the drainage of the Virgin River, there is archaeological evidence of an abandonment of settlements containing walled structures about A.D. 1150. From the structures and the pottery found there, researchers feel that a now extinct Uto-Aztekan people, related to Hopic or Pima groups, inhabited the area. King suggested that this group may have produced the occupations classified as Amargosa. Later, Yuman groups from Baja
California expanded along the Colorado River and may have inhabited the area between about A.D. 700 and 1500, Yuman I and II time periods. After A.D. 1500, Southern Piute groups living in the Spring Mountains area (Charleston Mountains)—the story country of Chemehuevi myth—moved southward and replaced the Yuman speaking peoples.

The Chemehuevi, a Southern Piute group, branched off from the Virgin River Piutes and migrated into the area. Both the archaeological record and Chemehuevi tradition suggest that they did replace a Yuman group—the Desert Mohave—around A.D. 1500. As informants told John Peabody Harrington (King and Casebier 1976)

The Desert Mohave lived at Providence Mountains, Old Woman Mountain, and clear out to Soda Lakes. The Chemehuevi fought these Desert Mohaves in a long warfare of many years and killed nearly all of them, but a few of them escaped and lived among the river Mohaves. The reason for this fight was that the Desert Mohaves held the springs and the Chemehuevi wanted them.

Indian Occupation of the Granite Mountains

The archaeological record indicates much activity in the Granites over the past 1000 years. This evidence could correspond to occupations of both the Desert Mohave and the Chemehuevi.

The Chemehuevi have lived in the Granite Mountains area since at least A.D. 1776. In that year, Padre Francisco Garcés stopped at two "Chemebet" rancherias in the Providence Mountains (Comes 1900). By "Chemebet" Garcés was referring to the Chemehuevi, probably using a corruption of the Mohave name for the tribe. Chemehuevi is a Mohave word meaning "mixed with all." The Chemehuevis called themselves tuumontcokowé—Black Bearded Ones—or referred to themselves as nawawá—the People (Laird 1976).

The "scattered and wandering tribe" had three subdivisions. The Desert Chemehuevi, called Tëëranëwë—Desert People—lived in the Granite Mountains region. The people were organized loosely into bands; each band took its name from the place the people considered their headquarters (Laird 1976). Early Indian agents Powell and Ingalls described one such band, the "Timpashawagotsits" in the Providence Mountains—the
Timpisagwagatsitci or Green Stone. Perhaps this band ranged into the Granites; however, it is possible that the Granites—Toyongkariri or Boulder Sitting—supported a separate band (Manners 1974).

Researchers do not have specific estimates for the population of the Granites. Groups undoubtedly wandered over the area exploiting seasonal abundances. Kroeber estimated the population density of the region as one person per 15.6 square miles (Manners 1974). In 1873, Powell and Ingalls recorded a total of 85 people in the Providence, Kingston and Clark Mountains. King (King and Casebier 1976) estimated that one half of that group lived in the Providence Mountains area. King felt that between 50 and 100 people lived in what the BLM now calls the East Mojave Planning Unit in the protohistoric time period.

The Chemehuevi had a special way of owning land. Each man inherited a song, and with the song, the territorial rights to a hunting range. The songs described the route through the territory, the landmarks and the watering places, making an oral map of the hunting range. They also described the hunter's equipment, the character of the land, and expressed sympathy for the animal hunted. Carobeth Laird (1976) wrote that

From the songs and from the Chemehuevis' attitude toward them one learns that the connection between a man, his song, and his mountain . . . was sacred and unbreakable, and that the animal he pursued was included in this sacred unity.

The Mountain Sheep Song covered land west of the Colorado River. In the northern hunting region, the song was subdivided into blocks covering mountain ranges, including one variant specifically for the Granite Mountains. Inheritance of the song gave its owners the right to hunt in the Granites and the right to bring others hunting in the range. Moreover, the song gave its owners a map of the Granite Mountains, naming in order its springs and landmarks.

The Granite Mountains Mountain Sheep Song has disappeared without any record of its composition, route, or extent of ownership. The Granite Mountains song was probably extinct before 1900. As Laird (1976) wrote about one of the last claimants to the Granites, an old man who probably
did not own the Granites song,

Prior to the turn of the century one old man laid claim to all the game in both the Providence and the Granite Mountains, each of which was formerly covered by a distinct version of the Mountain Sheep Song whose legitimate owners were now all dead. This individual lived most of his life ... beside a spring between the two ranges [probably Arrowweed Spring], where he irrigated a small field. He was a mountain sheep shaman and was said to be able, by his shamanistic power, to protect "his" game ... from all would-be hunters.

Hunters probably made trips into the Granites in all seasons, depending upon the availability of other food resources. As King described the Chemehuevi seasonal patterns (King and Casebier 1976), much of the hunting may have been in the fall, when the people moved to camps in the higher elevations of the Granite Mountains to harvest pinyon nuts. While the women and children gathered the pine nuts, the men may have made hunting trips.

After the pinyon-nut harvest, people probably moved to winter villages; researchers think that more people came together in the winter settlements than at any other time. The people lived in domed houses and ate stored foods supplemented by cacti and other food from the village vicinity. Archaeologists found evidence of winter houses near Mitchell Caverns in the Providence Mountains—the only place in the BLM East Mojave Planning Unit where such sites have been found. People hunting and gathering in the Granites could well have wintered in the Providence.

In spring, people dispersed into smaller family groups. In some years, people traveled to the Ivanpah Mountains and Mescal Range to gather and roast mescal (Agave utahensis). Perhaps, in other years, groups came to the Granites and gathered the mescal species there (Agave deserti). In late spring, the fruits of the yuccas, called yucca dates, ripen; these yucca dates were a very important food source, and yuccas are common in the Granites.

During the summer, people utilized seed-bearing plants. When the ricegrass (Oryzopsis hymenoides) on the dunes ripened, groups camped near the Kelso Dunes. Michael Kuhn (pers.comm. 1978) found evidence of camps...
in the foredunes, and it is likely that groups camped in adjacent areas in the Granites. Lieutenant Carr reported seeing significant Indian activity in the dunes and the northern Granites during a foray against the desert Indians in 1860 (Casebier 1972); since the campaign took place in May and June, people had probably come to the area to harvest grasses. Chemehuevis also came to the Granites during the summer to pick juniper and service berries (\textit{Juniperus} sp. and \textit{Amelanchier utahensis}).

In late summer before the pine nuts ripened, and probably at all other times of the year, especially when no other major food sources were available, people in the Granites caught rabbits, chuckwallas, wood rats, mice, and other small animals.

\textbf{Archaeological Sites}

The people who hunted, gathered, and camped in the Granites left substantial evidence of their activities. There are about 96 currently known archaeological sites in the Granites: 54 previously discovered ones, 30 discovered during our survey, and about 12 sites to be recorded by Michael Kuhn. One archaeologist has estimated that for every known site in the Granites, there are five more yet undiscovered.

These sites occur in almost all parts of the range, however, there are several especially sensitive areas with concentrations of known archaeological sites (see Sensitive Archaeological Areas map, page 181). All three University of California reserve sections fall within these sensitive zones. Reserve Sections 5 and 17 (T8N R13E) are in two of the most critical areas in the Granites.

The known sites include three villages: one at the mouth of Cottonwood Basin, one in Willow Spring Basin, and one discovered during our fieldwork, in the eastern portion of Cottonwood Basin. All have extensive midden deposits, indicating regular or lengthy habitation. Temporary campsites and shelter caves have been found around Granite Cove, Snake Spring, Willow Spring, Granite Pass, and Dripping Spring. A projectile point found in the upper part of a long canyon, pottery sherds along a high ridge,
and a broken storage vessel cached in a steep canyon suggest that hunters probably did roam the mountains seeking game.

Potsherds scattered throughout the range show that the Chemehuevi, who were principally basket makers, were involved in the broad desert trade network. Davis (1974) wrote that the Chemehuevi traded eagle and hawk down to the Mohave, basketry caps and conical burden baskets to the Cahuilla, and shell beads to the Western Yavapai. The Desert Chemehuevi probably received their pottery from within a 150 mile (240 Km) radius (King and Casebier 1976), perhaps from Mohaves along the Colorado River. Researchers have identified 14 different pottery wares in the East Mojave. The pottery found in the Granites probably dates from about A.D. 1000 to A.D. 1800, and most likely is from between A.D. 1200 and A.D. 1700 (pers.comm. Ritter 1978).

Perhaps the most exciting cultural sites in the Granites are the thirty known rock art sites—pictures painted onto or etched into rocks by unknown artists at unknown times for unknown reasons. The Stebbins group (Stebbins et al. 1978), wrote that the California desert contains the world’s largest collection of prehistoric art; Carol Rector (King and Casebier 1976) said that the BLM East Mojave Planning Unit encompasses one of the largest concentrations of known rock art sites in the Mojave Desert. These sites cluster in two areas, the largest of which runs in a curved line from Hart, near the Nevada border, south and west through the Piute, Hackberry, and Providence Mountains, ending at the Granite Mountains. This makes the Granites a type of distributional limit for Mojave Desert rock art, perhaps increasing the importance of sites in the range.

No researchers pretend to totally understand rock art. Laird (1976) only mentioned that marked or carved rocks are called tutuguuvo?opi which means marked by animal familiars—the spirit animals who act as helpers to shamans, the spiritual healers or doctors of the tribe. Heizer and Clewlow (1973) assigned San Bernardino County, and thus the Granites, to the Great Basin Pecked style of petroglyphs. Carol Rector (King and Casebier 1976)
wrote that this definition of style loosely applies to the eastern Mojave, though many individual sites do not fit the definition. The petroglyphs of the Granites are in the category of Abstract Rectilinear (painted) as defined by Grant (1971). However, these classifications do not begin to explain the rock art itself. As James Davis (1962) wrote about the Providence Mountains, and is true about the Granites:

At present it is impossible to assign the authorship of the petroglyphs in this region to any one of the described phases or to the peoples inhabiting the region in pre-pottery times.

Heizer and Clewlow (1973) accepted the age of California examples of Great Basin petroglyph style as no older than 1000 B.C. and probably not much younger than A.D. 1000 to A.D. 1500. Pictographs could be much younger; some have been known to vanish within 100 years (King and Casebier 1976) so extant paintings could be quite recent. So far, absolute dating for rock art sites has depended upon correlation with nearby archaeological remains; however, this requires the assumption that the datable artifacts and the rock art were left by the same people. Researchers estimate relative dates of different petroglyphs by examining differential patination. Theoretically, heavily patinated elements should be older than fresh looking ones. Archaeologists are working on new dating techniques, including a method to date petroglyphs by neutron activation of the patina (King and Casbier 1976). Without clear dates or known authorship, Carol Rector could only suggest that all peoples occupying the desert region could have contributed elements:

Prior to 1 A.D. petroglyphs were probably made by travelers and traders moving through the Eastern Mojave Desert between the west coast and the Colorado River, and by people exploiting the turquoise resources in the area. This probably continued into historic times. . . . Rustler's Rock-shelter in the Providence Mountains dates from 750 A.D. to 1700 A.D. (Davis 1962). Petroglyphs nearby were possibly made during this period. The Mohave Indians probably occupied the area from about 1 A.D. to approximately 1500 A.D. (King 1972), and contributed many of the elements. After 1500 A.D. the Chemehuevi occupied the area and made many of the most recent elements.

Even if researchers could date the rock art, it is doubtful that anyone will ever have a certain interpretation of the function of
petroglyphs and pictographs. One of the oldest ideas is that rock art was a form of writing. Mrs. Frances Staples, former owner of Granite Cove, said that someone "read the Indian writings" at Granite Cove and found a message about a permanent spring above the Cove. Mrs. Staples (pers.comm. 1978) said there was such a spring in that region. Others suggest that rock art elements are doodles or signatures or "a vague but universal expression of cosmic mysteries." However, most researchers argue that elements can not be translated and do not have a one-to-one meaning correspondence (Heizer and Clelowl 1973).

Researchers now seek a generalized explanation of rock art. Heizer and Clelowl (1973) hypothesized that the Great Basin-style petroglyphs convey hunting magic or are part of a hunting ritual, based on associations with migratory trails, corrals, blinds, dummy hunters, good ambush spots, and representations of hunters attacking game. Davis (1962) found petroglyph sites in the Providence Mountains along game trails, at the mouths of canyons, and near watering places, suggesting a hunting-magic hypothesis.

Carol Rector (King and Casebier 1976) argued against this theory in the eastern Mojave Desert, especially since some of the associations present in Heizer and Clelowl's study are not found in the area. It is likely that there had never (until very recently) been deer in the eastern Mojave, some of the areas with numerous petroglyphs never supported mountain sheep, representational elements of game or humans are not common, and no hunting scenes have been found in the area.

For all of the sites studied, Rector found that rock art was associated with water. She wrote that

petroglyphs occur on points and ridges jutting out from mountains, on canyon walls, along arroyos, and at the confluence of arroyos. They are along trails and passes and gorges . . . All are associated with present seasonal or permanent water sources. Furthermore, glyphs of the Eastern Mojave are associated with probable seasonal or permanent camps or shelters which contain midden, flaked stone, detritus, sherds, ground-stone, and rock rings which may be remains of house structures.

Most of these generalizations seem to hold true in the Granite Mountains. However, not all of the sites are clearly associated with water,
and there are several water sources without known rock art sites.

Rector noted that rock art in shelters and caves may represent a function "tied to esoteric shamanistic practices involving the supernatural, or . . . involved with initiation ceremonies." She wrote that most of the rock art in the eastern Mojave served as a way to mark territories, routes of travel, and water sources.

Aboriginal movement in the Eastern Mojave was dependent on the availability of water and easy access. Subsistence was dependent on the more abundant resources found around water. Many Eastern Mojave petroglyphs appear on trails and natural access routes at water sources. One of these trails is the Old Mohave Trail. . . . Wherever water is available along this trail, there are petroglyphs.

Previous Archaeological Research

Archaeological research in the Granites, with the exception of Carol Rector's 1976 analysis of rock art sites in Granite Cove, has focused on site surveys. Researchers from the San Bernardino County Museum (SBCM) have conducted site surveys in the eastern Mojave since 1946, making some surface collections of artifacts. Artifacts have been collected from the Granites, including a bow and a "Mohave-type vessel with lid" from near Granite Pass. The site report on the latter is missing; records of other early collections and the artifacts themselves may have been lost. Many of the sites in the Granites were recorded by workers from the SBCM. In 1970, Museum personnel made a special effort to record sites in the Snake Spring area, because BLM had planned a campground for that culturally sensitive spot.

Since 1962, Dr. Michael Kuhn, an avocational archaeologist, has been systematically surveying portions of the Granites. He is in the process of recording sites, and plans to file his site photographs and small surface collection of points and tools at the University of California, Los Angeles. Since 1963, Arda Haenszel had been recording sites in the eastern Mojave. She and Robert Reynolds of the San Bernardino County Museum recorded most of the SBCM sites in the Granites. Most were recorded in the
early 1970s. She filed extensive, detailed reports with the museum.

In 1976, Bureau of Land Management archaeologists, in an effort to achieve an intensive survey of 1.5% of the surface of the BLM East Mojave Planning Unit and obtain a 5 to 10% inventory of the area's cultural resource potential, surveyed sample sections of land throughout the planning unit. The team chose three one-mile-square sections in the Granites as East Mojave Sample Units (EMSU). A survey of the first randomly chosen section (EMSU 1 - Section 30 T9N R12E), an area high up the unnamed northwestern canyon—labeled Cirk Canyon by our study team—yielded no archaeological sites. However, the four archaeologists found two sites along the wash north of the sample unit.

Based on the existing archaeological record, researchers purposefully selected two other sample units, EMSU 37 - Section 6 T8N R13E - near Cottonwood Springs, and EMSU 42 - Section 35 T8N R12E - south of Willow Spring Basin. The intensive field inventory of EMSU 37 revealed three new sites, a disappointment for the researchers; however, they confirmed the existence of the extensive Cottonwood Village site just northeast of the sample unit. Originally, the researchers selected a section in upper Willow Spring Basin for EMSU 42. After a reconnaissance of the area, the survey team shifted the unit one section south. They found 16 sites in this section, including a large, open village site. Twelve of the sites represented habitation or base camp activities. The survey team speculated that more sites, indicative of more specialized activities, could be found radiating out from the village site. No collections were made (BLM 1976a).

Our archaeological field work was limited by time constraints and our nominal expertise. However, with the help of archaeologists Eric Ritter and Michael Kuhn, and with assistance from students in a University of California, Santa Cruz natural history course, we recorded 30 archaeological sites and three historic sites. We field-checked existing sites and compiled a photographic record of most of the sites. Our survey, neither systematic nor thorough, indicates the potential for many more undiscovered sites in the
Granites.

Collections from the Granites currently exist at the San Bernardino County Museum and in private hands. Present and previous landowners probably maintained collections. Mrs. Staples (pers.comm. 1978) told us of the theft of her son's jar of arrowheads by soldiers involved in World War II training exercises; private collections have a way of being spread to unknown locations. Owners of the house at Dorn's Camp reportedly had large collections of Granite Mountains artifacts.

Protection of Cultural Resources

The significant and fragile cultural resources of the Granite Mountains deserve special protection. Executive Order 11590 directed all federal agencies to inventory the cultural resources of their lands and to submit qualified sites to the National Register of Historic Places. All nominated sites must be protected. The BLM (1976a) has proposed four archaeological districts and one site for inclusion in the National Register: Granite Cove, with its remarkable collection of rock art, including the only figure of a human holding an arrow in the east Mojave; Snake Spring, termed "part of the impressive Granite Mountain rock art and habitation locality"; Cottonwood Village, "one of the remaining village sites in pristine condition"; Willow Spring Wash, another of the few village sites in the East Mojave—researchers wrote that "the significance of this site and its excellent condition" make it "historically invaluable"; and the Carr Canyon Petroglyphs, over 100 petroglyph elements and a few pictograph elements, where "the isolated location of the site, the historical documentation of the area and the site's association with the Granite Mountains provide an excellent opportunity for further archaeological investigations."

If these sites are accepted onto the National Register, the National Historic Preservation Act of 1966 (PL 89-655; 80 Stat 913) mandates protection regardless of ownership status.

June 8, 1906). The Act makes destruction of any sites on federally owned or controlled land a felony. Sites on lands owned by the state or by an agency of the state fall under the California Public Resources Code, Chapter 1.7, Section 5097.5 (July 1965), which states:

No person shall knowingly and willfully excavate upon or remove, destroy, injure or deface any historic or prehistoric ruins . . . (or) archaeological site . . . including . . . inscriptions made by human agency, or any other archaeological, paleontological or historical feature, situated upon public lands . . . (as used in this section, "public lands" means land owned by or under the jurisdiction of, the state or any city, county, district, authority, or public corporation or any agency thereof).

Regardless of ownership, the California Administrative Code, Title 14, Section 4307 states that

no person shall remove, injure, disfigure, deface, or destroy any object of paleontological, archaeological, or historical interest or value.

The California Penal Code, Title 14, Section 662½ declares that

every person . . . who willfully injures, disfigures, defaces, or destroys any object or thing of archaeological or historical interest or value, whether situated on private lands or within any public park or place, is guilty of a misdemeanor.

Further, any proposed development would be subject to Section 21001c of the California Environmental Quality Act, which provides for the consideration of cultural resources in any study of environmental impacts. Impacts on cultural resources, like impacts on natural resources, must be mitigated if the resource is endangered.

The BLM has provisions for special status for culturally significant areas. The bureau's Technical Note 252 proposes Archaeological Wilderness Areas, to include Archaeological Resource Zones—managed as natural areas, Archaeological Wilderness Zones—managed as primitive areas, and Scientific Reserve Zones—specially managed to minimize all impact. No such zones have been proposed for areas in the Granites.

Archaeological sites need special protection from numerous threats. Bureau of Land Management planners (1976a) describe pothunting and vandalism as the greatest threats to cultural resources. We noticed signs of pothunting, and heard of several private collections of artifacts from the Granites.
Other rock art areas, after being publicized, have suffered extensive damage from vandals and thieves. Laws and policies protecting cultural resources must be enforced—a difficult proposition when the BLM Cima Area has one ranger spending an average of one weekend per month in the field.

Sanctioned land uses also threaten sites. Increasing recreational use of the desert brings more people into the sensitive areas. Some areas where prehistoric populations camped also attract modern campers. Many areas around springs in the Granites have modern garbage and Chemehuevi potsherds. In one currently used primitive campsite, fires built against a rock face covered with petroglyphs have obliterated the rock art elements. Off-road vehicle use can be particularly damaging, causing erosion, disturbing sites, and destroying artifacts. We found a large shattered potsherd in the wash below Dripping Springs Pond—with motorcycle tracks running directly over it. As recreational use of the Granites grows, the likelihood of individuals accidently or intentionally removing artifacts and disturbing sites increases.

Other land uses have potentially damaging consequences. Mining, with its concomitant road-building and earth-moving, clearly presents a hazard to cultural resources. Livestock grazing and feral burro activity effect archaeological sites. Grazing may accelerate erosion, exposing or removing artifacts; animal use of springs impacts the spring area, disturbing the archaeological record. Village sites and other large open sites are especially vulnerable.

Ineffective management also threatens cultural resources. As a BLM document (1976a) stated:

Lack of effective management indirectly impacts cultural resources. Restraints on manpower and funding, as well as lack of enforcement powers all limit the effectiveness of management in mitigating impacts on cultural resources.

Clearly, improved management will be necessary to safeguard the cultural resources of the Granites, if the area is subject to the pressures of increased use. Cultural resources—non-renewable, fragile, and limited—
deserve special protection. All users of the Granites, recreationists and scientists alike, should learn of the cultural sensitivity of the area and the reasons not to disturb or destroy the irreplaceable resources.

Suggested Additional Research

The archaeology of the Granites merits further study. Many parts of the Granites have never been surveyed; researchers will surely discover new sites to add to the richness of the archaeological record in the Granites. The rock art sites need special study. Since the pictographs may fade rapidly, and because the petroglyphs could become targets for vandalism, a complete photographic record should be made periodically to note any changes and to preserve as much of the information as possible. Perhaps an effort should be made to obtain, or at least photograph, collections from the Granites in private hands. Information on previous archaeological surface collections should be gathered, and some type of index to the location of these collections prepared. Further research in the Granites could increase knowledge of previous uses of the range, and provide answers to some of the broader questions that archaeologists and anthropologists are struggling to answer.
HISTORY

The Granite Mountains were not the center of much historically significant activity. Most explorers and subsequent travelers passed to the north of the Granite Mountains on the Mojave Road, and the Granites receive little or no mention in their accounts. Mining activity was limited; no major booms occurred in the Granite Mountains, as they did in the Providence, New York, and Clark Mountain areas. Grazing and settlement have both occurred on a small scale.

Perhaps the most important historic event affecting the Granite Mountains was Carleton's Pah-Ute Campaign of 1860. Lieutenant Milton Carr, with a detachment of dragoons, circumnavigated the Granite Mountains on June 1 and 2, 1860. His notes, probably the first written account of the range, provide an excellent description of the Granite Mountains as they were in 1860.

The Mojave Road

Early activity in the eastern Mojave Desert centered on the Mojave Road, which ran 25 miles (40 Km) north of the Granite Mountains. The Mojave Road was originally an Indian trail, used frequently by Mohave Indian traders on their way to and from the Pacific coast.

In 1776, a group of Indians guided Padre Francisco Garcés of the Mission San Xavier del Bac across the Mojave Desert on the trail. Garcés account of the journey is the earliest written record of the eastern Mojave.

According to the desert historian Dix Van Dyke (1927), Garcés did not follow the route that was later to become the Mojave Road, but instead came through Foshay Pass in the Providence Mountains, and passed through a "cañada" (sandy wash) that meanders through the Kelso dunes, until he arrived at Soda Lake. He passed much closer to the Granite Mountains than many subsequent travelers across the Mojave.

Most mission fathers considered the Mohave warriors dangerous trouble-makers; Father Garcés, however, was an exception. Father Pedro Font (Van
Dyke 1927) wrote:

Padre Garces is so fit to get along with Indians, and go about among them, that he seems like an Indian himself. He shows in everything the coolness of an Indian; he squats cross-legged in a circle with them; or at night around the fire, for two or three hours together or even longer, all absorbed, forgetting aught else, discourses to them with great serenity and deliberation; and though the food of the Indians is as disgusting and as nasty as their dirty selves, the Padre eats it with great gusto, and says that it is appetizing and very nice. In fine, God has created him, I am sure, wholly on purpose to hunt up these unhappy, ignorant and boorish people.

In late 1819, Lieutenant Gabriel Moraga led a force of about 50 Spanish soldiers across the desert to punish the Mohave Indians who had been committing "deeds of violence" against the Spanish missions. Moraga never reached the Indian villages because his horses gave out in the rough desert terrain. He may have gotten as far as the present town of Kelso (King and Casebier 1976).

The Mohave Indian Trail was used by American mountain men in their explorations for new beaver country. Jedediah Smith, the first American to reach California overland, followed the Mohave Indian Trail on both his crossings of the desert, once in 1826 and again in 1827. On the second trip, Mohave Indians killed half his party at the Colorado River. Other trappers who used the Mohave Indian Trail include William Wolfskill, George Yount, Kit Carson, Ewing Young, and Peter Skene Ogden.

Between 1829 and 1848, traffic through the eastern Mojave went by a more roundabout route because of the hostility of the Mohave Indians at the Colorado River. This route, known as the Old Spanish Trail, led northwest from New Mexico into central Utah, then turned southwest until it met the Mojave River. The exact route through the eastern Mojave is not known; probably two or more routes were used, one following the Mohave Indian Trail (King and Casebier 1976).

Explorations and Surveys, 1850 to 1860

California became a state in 1850, following the Mexican War (1846-1848). The discovery of gold and the need to defend the new state created
much interest in possible trails to California. There was also much discussion of the possibility of a transcontinental railroad.

In 1853 and again in 1854, a private citizen named Francois-Xavier Aubry traveled across the desert from California to New Mexico to explore the 35th Parallel Route (the direct route connecting Los Angeles with Albuquerque). On this first trip, Aubry and his party were repeatedly attacked by Indians. He took sixty well-armed men with him on his second trip, and had no trouble with the Indians. His route the first time was possibly as far north as the present Interstate 15; his second trip was probably further south (King and Casebier 1976).

Also in 1853-1854, between Aubry's two explorations, the Army Corps of Topographical Engineers conducted surveys of the four major east-west railroad routes. The idea behind the surveys was to collect enough scientific data that the "most practicable and economical route" could be identified. These Pacific Railroad Surveys did not settle the arguments over the transcontinental route; the data merely added to the controversy.

Lieutenant Armiel Weeks Whipple conducted the 35th Parallel Route Survey. Mohave Indian guides led Whipple from the Colorado River to the Mojave River by a route that led to Marl Spring, through Jackass Canyon in the Old Dad Mountain region, and across the southern end of Soda Lake. Several of the names that Whipple gave to landmarks remain today: Pah-Ute Creek, Rock Springs, Marl Spring, and Soda Lake.

Lieutenant Robert S. Williamson of the Topographical Engineers was assigned to survey passes through the mountains of Southern California. In the course of his survey, he explored the Mojave River and Soda Lake, and determined that the Mojave River does not flow into the Colorado.

Between 1855 and 1857, the General Land Office (GLO) contracted with private individuals to have the township lines of the State of California surveyed. These surveys brought a relatively large number of people into the desert, but the surveys were of little value since later surveyors could not relocate the markers left by the GLO surveyors.
In 1857, Lieutenant Edward Fitzgerald Beale was ordered to construct a wagon road over the 35th Parallel Route from Fort Defiance across northern Arizona to the Colorado River "at a point opposite the supposed mouth of the Mohave River"—even though Williamson's survey had already determined that the Mojave River did not reach the Colorado. Beale continued across the Mojave Desert along the Mohave Indian Trail after completing his exploration to the Colorado River.

As part of his assignment, Beale brought 25 camels with him across the Mojave. He was ordered to test "their usefulness, endurance, and economy." The camels attracted much attention, and for several years camels were used for various purposes. They did not last long as beasts of burden; they frightened horses, they were expensive, and the railroads, when they were built, provided a much faster mode of transportation.

Beale returned to New Mexico over his newly marked road in 1858, and submitted a report declaring the road suitable for emigrant traffic. At least five trains of emigrants tried to travel to California on this wagon road in 1858. Two groups traveled as far as the Mohave Villages but were attacked there by Mohave Indians. Several members of the party were killed, and the emigrants were forced to retreat to New Mexico.

At the same time that the emigrants were attempting to use Beale's Wagon Road, the Post Office Department arranged for a mail route (the Central Overland Mail) over the new road. The mail carriers had trouble with the hostile Indians (Hafen 1926). This, combined with the attacks on the emigrants, was enough to convince General Clarke, the military commander in California, to take action against the Mohaves.

Military Operations Against the Desert Indians

The Colorado Expedition

The Colorado Expedition against the Mohave Indians was led by Major William Hoffman in December 1858 and January 1859. Four companies of the 6th Infantry with an escort of 50 dragoons marched over the Mohave Trail
to the Colorado River.

Hoffman had been instructed to establish a post on the east bank of the Colorado at Beale's Crossing; however, Mohave Indians attacked Hoffman and his troops, forcing them to retreat. Hoffman recommended that the next attempted expedition against the Mohaves be marched up the Colorado River from Yuma. In April 1859, the Mohaves surrendered, faced with Hoffman's command of nearly 600 men. The post that Hoffman established at Beale's Crossing was named Fort Mojave.

Mohave Indians attacked a mail station near Fort Mojave in July 1859. A battle between the Indians and the troops from the Fort occurred in early August. For several weeks following this battle, patrols were sent out from the Fort to burn Indian rancherias and crops. Finally, a peace conference was held at which the Indians agreed to give up part of their land—marking the end of the Mohave nation.

The Mojave Road was finally developed as a wagon road in 1859 by the trains of Army Quartermaster, Captain Winfield Scott Hancock, on their way to supply Fort Mojave. The Fort was maintained until 1890.

Carleton's Pah-Ute Campaign

The Mohave Indians were not the only ones troubling immigrants and travelers in the desert. The desert Indians, native groups that the explorers and settlers called Pah-Utes, often begged and stole stock from wagon trains using the Salt Lake Trail. Desert Chemehuevis were probably involved in many of these incidents (Laird 1976).

In January 1860, some Indians ambushed and killed a white man who was searching for stolen stock near the Mojave River. In March of that year, two more men were killed near Bitter Springs by a band of Indians who had offered to show them a place where they could get water and grass for their wagon train.

The three deaths caused great public outrage. The most prominent citizens of Los Angeles signed a petition calling for the establishment of a military post to protect travelers on the Salt Lake Trail. In response
to this demand, military authorities ordered Major James Henry Carleton to lead an expedition against the desert Pah-Utes and to chastise any Indians he might find in the vicinity of Bitter Springs. His orders stated:

The General, then, has decided on the following line of conduct: On the commission of every murder and as soon thereafter as practicable to send a force and punish the Indians, and as it is impossible to ascertain the individuals or the particular band in each case of murder, and is as certain that their acts are connived at by the tribes in the vicinity, the punishment must fall on those dwelling nearest to the place of murder or frequenting the water course in its vicinity.

Carleton established a base camp (Camp Cady) on the Mojave River on April 19, 1860. His men killed two Indians about 12 miles (19.2 Km) southwest of the camp on the same day, took the bodies to Bitter Springs, and hung them on a gallows as a warning to other Indians.

Carleton ordered Lieutenant Milton T. Carr to lead a ten-day scout to Soda Springs and the Providence Mountains, and to build a redoubt at Soda Springs. On May 2, while scouting in the area of the Kelso Dunes, possibly in Devil's Playground Wash, Carr crossed an Indian trail. He and his dragoons followed the trail north until they came upon seven Indians near the foot of what is now called Old Dad Mountain (Casebier 1972). The dragoons killed three Indians, severely wounded one, and captured a squaw. They cut off the heads of the three dead Indians, placed them in a sack, carried them to Bitter Springs, and displayed the heads with the bodies of the two Indians killed earlier.

Lieutenant Carr made a second scout to Soda Lake and the Providence Mountains between May 28 and June 6, 1860. Carr and his detachment of dragoons circled the Granite Mountains on June 1 and 2. They stopped at what are now called Cottonwood Spring and Snake Spring, crossed through Granite Pass, spent the night in Granite Cove, found water in Willow Spring Basin, and saw considerable evidence of Indians in a canyon on the west side of the Granite Mountains (Casebier 1972):

June 1st. ... We then went S.W. to the North end of the other range [Granite Mountains], and found plenty of water, in a ravine [Cottonwood Springs], also plenty of bunch grass along the stream and abundance of Alfileria [Erodium cicutarium] on the plain, near the ravine. The water at this place

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is not permanent, Mr. Brooks says, although there is quite a fine cottonwood tree and a good many cottonwood bushes growing along it. We stopped here and grazed the animals for a couple of hours.

We then went up towards the pass through the two ranges, and about a mile and a half from this place, found, to the right in a ravine, a living spring [Snake Spring]. Along the ravine are a great many willows and small cottonwoods. The spring is not large, but will furnish sufficient water for forty or fifty animals, perhaps more, by digging it out. We then passed between the two ranges of mountains and went W of S about five miles to a gorge in the mountains where we found plenty of permanent water [Granite Cove]. This spring, which we call Diamond Spring, comes out of the side of the mountain about fifty feet above the bottom of the ravine, and is completely surrounded and covered with large boulders. A passage way to the spring has been cut through these rocks so that horses and mules can get to it. There is sufficient water for any number of animals, and it is very pure and cold. We found also plenty of grass here for our animals, and about a mile south of the spring, there is a great abundance of fine bunch grass. The pass through which we came to-day, is where the two ranges of mountains terminate in rocky points, formed of immense boulders piled on top of one another, forming some very high, pointed peaks. The plain on the East side of the mountain, is covered with these boulders generally lying around single, but occasionally in large piles. Saw two Mountain Sheep to-day, but could not get within rifle-shot of them. Camped at Diamond Spring for the night. Distance about twenty-six miles.

June 2nd. Left camp at 6 O’Clock A.M. Marched down the East side of the mountain, over very rough and rocky ground, following an old Indian Trail, part of the time. About four miles from Diamond Spring, found a deep rocky gorge in the mountain, with water in it. This water is very difficult to get at with horses, owing to the rocks and deep gullies [Willow Spring Basin]. At the S.E. end of this mountain found another place where there had been plenty of water a couple of weeks ago, but it had dried up. This place would furnish plenty of water for forty animals, up to the middle of May, I think.

We then went through a pass at the South end of the mountain and went up the Western side. About 3 O’Clock P.M. came to an old Indian trail (about three or four weeks old) that had been travelled backwards and forwards by a great many Indians. We followed this trail about three miles up a ravine until we came to a narrow, steep gorge, very rocky [Carr Canyon]. About three hundred yards up this, we found some old rancherias and a well about three feet deep dug in the sand. Mr. McKenzie dug this well a little deeper and found that water could be obtained by digging about two feet deeper. All along this gorge, and for some two hundred yards from it, were old rancherias, showing that there had been a great many Indians here earlier in the Spring. But there had evidently been none here within the last three or four weeks.

We then went down into a narrow plain between the mountain and the big sand ridge, followed up this about five or six miles and camped in front of a deep canyon in which there is plenty of water, but very difficult of access [Bull Canyon]. I sent Mr. McKenzie ahead to the point opposite the pass we went through yesterday, to see if there were any fresh signs of Indians. He returned and reported that there were no fresh signs at all. Where we encamped to-night, there is the greatest
abundance of fine, green bunch grass [Oryzopsis hymenoides], and in fact, wherever you find this white drift sand you can always get this grass. The tops of it are full of seeds which the Indians gather for making bread. There is plenty of water and generally grass, all through the Providence Mountains, during the Spring, but, with a few exceptions these water holes dry up about June.

The campaign against the Pah-Ute accomplished little. The Indians continued attacking small parties or lone travellers, and for several years many whites shot the Indians on sight (King and Casebier 1976). By 1870, the Pah-Utes' numbers were so reduced that they were no longer a threat.

According to local cowboy Mr. Dick Taylor (pers.comm. 1978), there were a few Indians in the Providence Mountains as late as the 1920s. Frances Staples (pers.comm. 1978) reports that the last Indian to live in the Granite Mountains was named Dusty. Dusty died sometime before 1920; he was burned with his saddle and bridle, and other possessions in a funeral pyre at Pine Tree Ranch near Arrowweed Spring in the Providence Mountains.

Railroad Development

The Mojave Road was the main route of travel across the Mojave Desert until 1883. In April of that year, the Southern Pacific Railroad Company completed a line to the Colorado River from the town of Mojave. The Atlantic and Pacific Railroad Company completed a line to the opposite bank of the Colorado in May 1883.

The Atchison, Topeka, and Santa Fe Railway bought Southern Pacific's Mojave-to-Needles line in December 1911. The line is still owned by the Santa Fe.

During the mid-1800s, Congress granted millions of acres of land to western railroad companies. Southern Pacific was granted certain odd-numbered sections of land for ten miles on each side of its right-of-way, exclusive of all mineral rights except those of coal and oil. When the railroad changed hands, Southern Pacific retained these land-grant sections. It has sold some of them but it still owns many. For a listing of sections owned by Southern Pacific Land Company in the Granite Mountains, see the
Mining Claims and Land Ownership map, page 205, and Appendix G.

The railroad that runs north of the Granite Mountains through Kelso was built by the San Pedro, Los Angeles, and Salt Lake Railroad Company in 1905. The Union Pacific Railroad acquired this line in 1921.

Road Development

Several roads in the Granite Mountains area, including the Kelbaker Road, probably began as Indian trails; prospectors searching the area for valuable minerals often used these trails. The trails were turned into roads by wagons, and were later improved for automobiles. The development of roads can be traced from old maps of the region and descriptions in U.S. Geological Survey Water-Supply Papers (Mendenhall 1909, and Thompson 1921).

As early as 1896, a prospector's trail led from Marl Spring on the Mojave Road south to Cottonwood Spring through Granite Pass, and on to Cove and Willow Springs. Another trail connected Cove Spring and the town of Fenner.

By 1915, the trail had been extended to Budweiser Spring and south to the Orange Blossom Mine in the Old Dad Mountains. From the Orange Blossom, two roads led south to the Santa Fe Railroad—one to Bagdad and the other by a more roundabout route to Amboy. There was a trail as well from the Orange Blossom to Bengal Siding on the Santa Fe, according to Thurston's Auto-Highway, Mountain and Desert Map of 1915.

In the 1921 water-supply paper, Routes to Desert Watering Places in the Mojave Desert Region, California, David G. Thompson (1921) describes the roads in the area:

A road leads east of north from Bagdad to the Orange Blossom Mine, about 10 miles distant. This road was not traversed by the writer, and the following description is based on more or less indefinite information obtained from various sources. Considerable money was spent on the mine and a mill, and the road was originally in good condition. . . . A road is said to lead from Willow Spring northeast to Providence Mountains and to connect with a road that is reported to lead north from Kelso. Cove, Van Winkle, and Cottonwood Springs are located on the map within a few miles of the south end of the Providence Mountains, according to information given by prospectors, but these locations, as well as the existence of a
road from Willow Spring to these other places, are very uncertain. At best, the roads northeast of Willow Spring, except that from Fenner to the Hidden Hill mine, are used very little and probably are in bad condition.

The road through Kelso to just east of Amboy became the Kelbaker Road. According to Frances Staples (pers. comm. 1978), she and Kenneth Staples made the Kelbaker passable from Granite Cove south, and Cliff Barnes improved the northern part from Granite Pass to Kelso. San Bernardino County began grading and maintaining the Kelbaker Road in 1958 (Belden 1958). A portion of the road from Kelso to the Vulcan Mine was paved by Kaiser Steel Company during World War II. San Bernardino County has since paved other sections of the road.

Interstate 40, near the southern boundary of the study area, was completed in 1973. This highway is a major route across southern California; it rerouted traffic from the old Route 66 through Essex and Amboy.

Present-day roads in the Granite Mountains are shown on the Access Routes map, page 9. Few of these roads have been actively maintained; most appear to have been created solely by the passage of vehicles. Some lead to mines, some to habitations, and some to favorite campsites. Others may have been put in by the military during World War II.

Modern Military Operations

There were two important modern military operations in the Mojave Desert. The first of these was the Desert Training Center/California-Arizona Maneuver Area (DTC/C-AMA), active from April 1942 to May 1944. The second was Exercise Desert Strike, a maneuver held from May 17 to May 31, 1964. Both included the Granite Mountains in their area of operation. Actual military use of the Granite Mountains was probably quite limited, but some evidence of the troops' presence has been found.

The DTC/C-AMA

The Desert Training Center (DTC) was established in 1942 to prepare troops for the anticipated campaigns against Rommel in North Africa. The purposes of the DTC were "training mechanized units to live and fight in
the desert; to test and develop suitable equipment, and to develop tactical doctrines, technique, and training methods," (Meller 1946).

General George S. Patton selected the land for the DTC, a parcel of over 10,000 square miles (25,900 sq km). It extended from the Colorado River to Desert Center, and from Searchlight, Nevada to Yuma, Arizona.

Patton and his troops left the DTC to sail to North Africa in October 1942. They were replaced by other troops. By July 1943, nearly 190,000 troops were stationed in the DTC.

The DTC was enlarged in early 1943 to include land as far north as Boulder City, Nevada and areas stretching from Pomona, California on the west to Phoenix, Arizona on the east.

The name of the Desert Training Center was changed to California-Arizona Maneuver Area (C-AMA) on October 20, 1943, to clarify that its purpose was not only desert training. Its new purpose was to train all types of units in combat and service, under combat conditions in the United States' first simulated theater of operations.

The nearest camp to the Granite Mountains was Camp Clipper. The 33rd Division and, later, the 93rd Division were stationed there. The Clipper Mountains were used as an impact area for explosive weaponry.

By April 30, 1944, the C-AMA had been evacuated and shut down, because service personnel needed to run C-AMA were more needed overseas, and because fewer divisions and air units would be remaining in the United States.

The Army closed the Kelbaker Road during the DTC/C-AMA operations, forcing Kenneth and Frances Staples to move to Amboy until the Army left the area. The Stapleses' property in Granite Cove was declared off-limits to the troops, but, still, the soldiers took things from the house, including a pint jar full of arrowheads that Milton Staples had collected over the years. The troops also tore down the Stapleses'corral, and burned the fence-posts to barbecue the last cattle remaining on the ranch. When the troops finally moved out, they left mounds of dirt containing cans and
other debris scattered behind them (pers..comm. Staples 1978).

**Exercise Desert Strike**

Exercise Desert Strike, held between May 17 and 31, 1964, involved more than 100,000 people from the Army, Air Force, Navy and Marines at a cost of $54 million (James 1964). The operations covered a huge area of more than 3 million acres (1.2 million hectares) in Arizona, Nevada, and California.

Exercise Desert Strike left its mark on the desert as the troops moved across the area from east to west. Shell cases, boxes, live ammunition, cans of food, batteries, tank treads and communication wire were left strewn across the Mojave. Hundreds of miles of roads were cut through the desert, some across country, and some parallel to existing roads. The scars left by the tanks, trucks, and jeeps are still visible in many parts of the desert.

The Granite Mountains area was not heavily used; however, evidence of the operations can be seen. Some kind of checkpoint, consisting of a few soldiers and tents, stood on the southeast side of the mountains (pers. comm. Casebier 1978). We found many olive-drab K-ration cans in Dripping Spring Pond and a hand-painted "Latrine Closed" sign in the Cove Spring area.

**Settlement and Land Ownership**

Settlement in the Granite Mountains has been quite limited. Two parcels of land are owned by private individuals specifically as homesites: 309.94 acres (126.15 hectares) in Granite Cove, and 40 acres (16.28 hectares) at Dorner's Camp near Snake Spring. Other private land holdings in the Granites include the Iron Victory patented mining claim (41.32 acres, 16.8 hectares), three sections of land (1848.76 acres, 752.45 hectares) purchased by the University of California Natural Land and Water Reserve System, and Southern Pacific Land Company sections. Sections 16 and 36 of each township are owned by the State of California. These lands were
deeded to the state by the federal government to be sold for the purpose of financing public schools (see Mining Claims and Land Ownership map, and Appendix G).

The land in Granite Cove was homesteaded in 1927 by Kenneth Staples, superintendent of the Amboy Salt Mine, and his wife Frances. Their deeded land totaled about 320 acres (130.25 hectares). The Stapleses, Kenneth's father, and Ralph and Rena Stevens all built homes in the Cove. They helped each other build the houses, beginning with a corrugated iron cookhouse, next building the Stapleses' house, then the Stevenses', and finally Kenneth's father's house. The two couples finished their houses with stone-work.

When Rena Stevens died, Ralph sold their property to Kenneth's father. Eventually Kenneth and Frances bought all the property.

The Stapleses sold their land to William Moore of Sheridan, Wyoming in 1963. Moore kept it until 1967, when he sold it to Art Parker, Sr., the present owner.

We do not have such specific information on the land at Dorner's Camp—or "Horner's Camp", according to Frances Staples (pers.comm. 1978). A man named Billings, from Pasadena, sold it to Jerald and Lucielle Tuck, the present owners, in the late 1930s or early 1940s. Billings had a caretaker, Herman Sulligar, who lived alone with his dog. Sulligar was "a nice, refined old man" who prospected in the Granite Mountains. Sulligar stayed on as caretaker after the Tucks bought the property.

A Mexican family named Sandoval lived in a house just outside Granite Cove from the early 1930s until 1947 or 1948 when Mrs. Sandoval died. Mr. Sandoval moved to San Bernardino and, eventually, back to Mexico. (pers. comm. Staples 1978).

The California botanist Willis L. Jepson visited the Granite Mountains on a collecting trip in 1941. He wrote the following description of Granite Cove and the Sandoval family in his field journal:

We turn off the road left on to wagon trail leading up
into a cove or flat jutting into the mountain between short spurs. I see a house—a small one and as we come up to it we notice a woman, about forty or so, very dark and ill-favored, a group of four children, all girls, that swarm out to us. Their racial identity is not at once obvious—since they do not look like any of the California native tribes I know. The two younger children are so dark as to look negroid; the oldest girl, about 13, speaks English well enough. Soon we find the father who comes from a little ways above in a truck pick-up. He speaks English a bit and we learn there is a white man further up. This man of the truck looks Mexican. The cabin occupied by his family is comfortable, for this wild region, and sound. He goes with us 300 yards or so around a corner and here opens up a nice little vale, "the cove", and we see a beautifully constructed concrete and stone cabin with porches and painted roof and find a man named Staples who gives us much geographic information about the Old Dad Mts. [Granite Mountains]. He says the altitude of his place is 5000 feet.

Oscar Hoerner and his family built a house in Cottonwood Wash while they were working the Silver Queen Mine. The mine was active for 10 or 12 years from 1932 on (pers.comm. Hoerner 1978). The house has since burned down. There is presently a small, recently built shack at the Silver Queen, containing only a stone fireplace.

Other habitations in the Granite Mountains are the cabin on Murray Kidder's Golden Legend mining claim, and the Bunny Club, a cabin built by the Norris family at Dripping Spring on what is now University of California property.
LAND USE

Grazing in the Eastern Mojave

The eastern Mojave Desert has been used for livestock grazing purposes since the time of the earliest explorers. Most of the early use was concentrated along the Mojave Road as travelers journeyed between Arizona and San Bernardino. Thousands of horses, mules, and cattle were driven across the desert to be traded during the mid-1800s. Explorers, surveyors, and immigrant wagon trains all brought stock across the desert, and large herds of cattle were driven over the Mojave Road to supply Fort Mojave on the Colorado River.

Miners and prospectors used mules for pack animals. They also kept horses and cattle. Miners in the Rock Springs Mining District (about 40 miles or 64 km west of Fort Mojave) were probably the first to maintain domestic stock in the Mojave for extended periods of time (King and Case-vier 1976).

Burros were also used by the miners for pack animals. Many were abandoned and left to run wild as mines were closed. Feral burros are found today throughout the eastern Mojave.

In 1888, the "88" cattle operation was started. This was incorporated into the Rock Springs Land and Cattle Company (RSL & CC) in 1894. The RSL & CC was a very large operation, covering most of the grazing lands of the East Mojave Planning Unit and part of southern Nevada.

Under the RSL & CC, grazing pressure in the Mojave reached a peak. The company claimed 9223 head of cattle in 1920, and according to Ed Eldridge, the present head of the OX Cattle Company (a remnant of the RSL & CC), approximately 12,000 head were sold when the RSL & CC split up in 1927 (BLM 1976a). This high-intensity use may have contributed to a decrease in the quantity and quality of forage in the eastern Mojave.

The Taylor Grazing Act of 1934 ended the period of free open range and gave the federal government responsibility for supervision of grazing.
on public lands. Section 15 of the act authorizes the Secretary of the Interior to lease "vacant, unappropriated, and unreserved lands of the public domain" for grazing purposes.

There are currently nine leases in the East Mojave Planning Unit, on which BLM authorizes grazing of 2990 head of cattle. The BLM East Mojave Planning Area Analysis calculates the carrying capacity of the East Mojave Planning Unit as 60,000 Animal Unit Months (AUMs). One AUM is defined as the amount of forage a 1000-pound cow and her calf (up to six months old) require for one month. The Planning Area Analysis estimates that actual use may be greater than 120,000 AUMs.

The nine ranches in the East Mojave Planning Unit gross between one-half million and one million dollars per year from beef cattle sales. This is approximately 25 to 50% of gross livestock receipts desert-wide, and less than one-tenth of one percent of gross livestock receipts state-wide (BLM 1976). The primary objective of the livestock industry in the eastern Mojave is the production of calves for sale.

Grazing in the Granite Mountains

Beyond BLM internal publications, little has been written concerning grazing in the Granite Mountains. We obtained the following information from interviews with Mrs. Frances Staples, one of the original homesteaders in the Granite Mountains; Mr. Art Parker, Sr., current holder of the Granite Mountains lease; the late Mrs. Eunice Gallinari of the adjoining Gold Valley Ranch; and Mr. Dick Taylor, cowboy for local ranchers since the 1920s.

During the early 1900s, the Indian, Dusty, held the Granite Mountains water rights. Sometime before 1920, Dusty sold these rights to a man Mrs. Staples knew as "the Englishman." The Englishman lived at Pine Tree Ranch near Arrowweed Spring in the Providence Mountains. In 1920, Ed Cornell from Porterville bought the water rights from "the Englishman." These rights covered the Kelso Dunes, the Granite Mountains, part of the Providence Mountains, Van Winkle Mountain, and part of the Clipper Mountains.
Cornell also lived at Pine Tree Ranch.

Kenneth and Frances Staples bought the water rights in 1927. Their grazing land stretched over 200,000 acres (81,400 hectares). Usually, they ran from 200 to 250 head of cattle year-round, but in "good" years they ran more (pers. comm. Staples 1978). Cattle were placed near water sources, and whatever land they could reach from the watering place was considered their grazing range.

In about 1935, the Stapleses sold their northern water rights—from the fence at Granite Pass to the Kelso Dunes—to Cliff Barnes, who lived at Pine Tree Ranch. After six years, the Stapleses bought back this northern section.

The Stapleses left 30 or 40 head of cattle on the ranch during the 1940s Army occupation, planning to restock the area when the Army left. However, the troops slaughtered the cattle, and the Stapleses had to start over with new stock.

After the war, grazing lease fees were collected by the federal government. Lease boundaries were drawn according to private land ownership and water rights; private landowners and those holding water rights received the right to lease lands for grazing.

Mr. Staples lost a portion of his grazing lease in the 1940s when he did not file on it.

The Stapleses did not begin paying lease fees to Southern Pacific until the 1950s. Before then they were not charged for the use of Southern Pacific lands for grazing.

Many of the livestock improvements in the Granite Mountains were put in by the Stapleses' son, Milton, between 1947 and 1953. There were once two wells and windmills in Granite Cove, one windmill halfway across the valley between Snake Spring and the Providences, and two over at the base of Van Winkle Mountain. There was also a tank car at Van Winkle that was used to hold water pumped by the windmills. Every evening Mr. Staples rode around to check the springs and tanks, whittling dowels to fit bullet
holes in the tanks.

Burros were a problem for the Stapleses. Mrs. Staples said that burros would prevent cattle from getting near water. Mr. Staples carried a short carbine 30-30 with a telescope sight every day. The Stapleses would also invite their friends out to kill burros. Mrs. Staples said, "Cowmen killed burros by the hundreds. A cowman couldn't stay in business up there if he didn't kill the burros" (Ernst 1977).

In 1962 or 1963, the Stapleses sold the property to William Moore of Sheridan, Wyoming. He attempted to run sheep in the mountains, but his stock loss to predators was high. Moore later switched to running cattle.

In 1967, Art Parker Sr. acquired the grazing lease (the Granite Mountains Allotment). He currently holds it as an annual lease at $1.00 per AUM per year (BLM 1977c). Parker also leases approximately 9000 acres (3663 hectares) from the Southern Pacific Land Company (pers.comm Parker 1978).

The Granite Mountains Allotment includes 324,861 acres (132,218 hectares), 312,878 acres (127,341 hectares) of which are suitable for grazing (BLM 1976a). According to the Draft Management Framework Plan, "Granite Mountain proper is unavailable for cattle grazing due to the steepness of the terrain." During spring, 1978, we saw evidence of cattle over much of the range.

The Granite Mountains Allotment includes the Devil's Playground, part of Old Dad Mountains, the Kelso Dunes, the western part of the Providence Mountains, Van Winkle Mountain, the Granite Mountains, and a portion of the Bristol Mountains. The allotment is bounded by Interstate 40 on the south.

Range Management

The 1976 BLM Range Survey classified 85.5% of the Granite Mountains Allotment as ephemeral range, 4.3% as low-quality range, 9.9% as medium-
quality range, and 0.3% as high-quality range.

Ephemeral range, according to the East Mojave URA (BLM 1976a),

does not consistently produce yearly forage but periodically provides annual vegetation suitable for grazing. The production period is usually short with the forage being produced consisting of either winter or summer annuals. Favorable years for annual growth are highly unpredictable and may occur only one out of five.

The BLM has calculated a carrying capacity for the Granite Mountains Allotment of 2972.6 AUMs based on the 1976 Range Survey. There are presently 4716 AUMs authorized for the Granite Mountains Allotment. This is an overauthorization of 1743.4 AUMs (37%) over the carrying capacity of the allotment as calculated by the 1976 Range Survey.

The East Mojave Management Framework Plan contains several recommendations directly affecting grazing in the Granite Mountains. Perhaps the most important of these is the recommendation to eliminate grazing from the Cottonwood Basin Research Natural Area—a cutback of 44 AUMs, 1% of the total allotment. In the MFP the Cima Area Manager recommended the reduction of the current authorization by 49%: 37% to reflect the 1976 Range Survey findings, 1% to reflect exclusion of grazing in the Research Natural Area, and 11% to reflect exclusion of grazing on the Kelso Dunes.

The Riverside District Manager's decision, however, is to continue grazing at current levels except for the elimination of grazing in the proposed Cottonwood Basin Research Natural Area and on the Kelso Dunes (pers.comm. Hillier 1978). In an unpublished draft of the Management Framework Plan, step III, the district manager gives the following rationale:

The 1976 Range Survey indicates a relatively lower capacity for several allotments which is not supported by current conditions and plant responses. The survey provides drought-related information.

Grazing by domestic livestock is an important economic value of the region. Reduction to less than economic levels would result in the loss of not only the economic values, but a key tool to bring about further vegetative enhancement which is possible through implementation of intensive grazing management practices.

Grazing elimination will not guarantee desirable plant responses as evidenced by existing enclosures in the unit.

Though much of California experienced drought conditions during 1976,
data from Mitchell Caverns State Park in the Providence Mountains show an above-average rainfall for the 1976 season. Thus, the 1976 Range Quality Survey may represent actual range conditions more accurately than the District Manager implies.

During the next few years, Allotment Management Plans (AMPs) will be prepared for all public land grazing leases as authorized by the Federal Land Policy and Management Act of 1976 (FLPMA). The purpose of the AMPs is to provide "for grazing animals in a context of accomplishing vegetation enhancement objectives and mitigating any adverse impacts," (BLM 1977b). Prior to implementation of the AMPs, a grazing Environmental Impact Statement will be prepared as part of the desert-wide plan.

Burros

The burro population in the Granite Mountains is estimated to be 70 animals (BLM 1976a). This estimate is based on air and ground surveys conducted by BLM in 1974, 1975, and 1976. Mark Hatchell, BLM burro specialist, believes that this figure is too low and estimates a population of at least 146 burros (pers.comm. 1978).

Burros are believed to compete with bighorn sheep and cattle, particularly around springs and waterholes. According to Hatchell, burros and cattle eat many of the same forage species.

The East Mojave Management Framework Plan calls for complete removal of burros from the Granite Mountains. However, under current BLM policy as authorized by the Wild Free Roaming Horse and Burro Act of 1971, complete removal will be difficult if not impossible. The act allows three ways of controlling feral burro populations: relocation to other areas of public land, removal from the range and placement in the care of qualified individuals (adoption), and destruction "in a humane manner."

The BLM does not, at present, shoot burros. Roundups are held using helicopters, trap gates, and horsemen with ropes. The burros are placed in holding corrals until they are adopted. According to Hatchell, the cost
of preparation, roundup, holding, and adoption is about $240 a head.

Once a burro is adopted, the federal government remains legal custodian. The person adopting the burro cannot sell it or otherwise dispose of it without the consent of the BLM. The burros cannot be used for any commercial purpose. The BLM presently releases those burros that are not adopted.

Total removal of burros by roundup from the Granite Mountains would be difficult. A more complicated problem is preventing burros from migrating back into the Granite Mountains from the southern Providence Mountains. Still, the feral burro population in the Granite Mountains could be significantly reduced, if not eliminated, under provisions of the Management Framework Plan.
MINING

History of Mining in the Eastern Mojave

Mining has been an important industry in the eastern Mojave since the early 1860s. Considerable mining activity occurred in the Providence Mountains, Mid Hills, New York Mountains, and Clark Mountain region throughout the late 1800s and early 1900s.

No real booms occurred until about 1880 when the Bonanza King Mine on the eastern side of the Providence Mountains (Trojan Mining District) began production. The Bonanza King, a silver mine, produced millions of dollars worth of silver at a rate of $60,000 a month from 1883 to 1887 (Vredenburgh n.d.). The town of Providence sprang up around this mine.

The closing years of the nineteenth century were active ones for mining. Rich gold, silver, copper, and lead mines in the New York Mountains were developed, and the towns of Vanderbilt and Manvel came into existence. These mining towns were generally short-lived; Providence and Vanderbilt lasted little more than ten years.

The most active period of mining in the eastern Mojave was from 1900 to 1919. At that time, demand was high for base metals, and during World War I mines were developed for chromium, manganese, tungsten, and vanadium (King and Casebier 1976).

The Orange Blossom gold mine in the Old Dad Mountains was started in 1906. According to Thompson (1921),

considerable money was spent on the mine and a mill. . . . The mine had not been in operation for some time in November, 1917. . . . Water for the mill was piped from a spring about 4 miles northeast of the mine.

This spring was Budweiser Spring in the Granite Mountains. Miners at the Orange Blossom named the spring after the beer sold at the Orange Blossom Saloon. Apparently, the bartenders disposed of empty Budweiser bottles by simply tossing them out the door, until thousands of them covered the hillside (Belden 1964).

Between World War I and World War II, little mining occurred except
in small-scale gold mines. However, World War II caused another increase in metal-mining operations. The Kaiser Steel Company developed the Vulcan iron mine near Foshay Pass in the Providence Mountains. The mine was active from December 1942 to July 1947 and produced over two million tons of ore.

Since World War II, there has been very little mining in the eastern Mojave. The Management Framework Plan states that although there are presently 3016 known mining claims in the East Mojave Planning Unit, there is virtually no productive mining activity.

**Mining Laws**

Under the General Mining Law of 1872, vacant public surveyed or unsurveyed lands are open to prospecting, and to location and development upon discovery of minerals. The claimant must locate the claim by staking the corners, posting notice of location on the claim, and filing the location notice with the County Recorder of the county in which the claim lies. The Federal Land Policy and Management Act of 1976 requires recording unpatented mining claims with the BLM State Office having jurisdiction over the federal lands where the claim is located, as well as with the County Recorder.

To hold possession of an unpatented mining claim, the claimant must do at least $100 worth of labor per year per claim. The 1872 Mining Law requires that by October 1 of each year, an affidavit of annual expenditure be recorded in the County Recorder's Office and with BLM. Failure to perform the annual assessment work or to file an affidavit is considered an abandonment of the claim, and subjects the claim to relocation.

There are two types of mining claims: lode claims and placer claims. According to an Interior Department document (1971), a lode claim "legally can cover only a belt or zone of mineralized rock lying within boundaries clearly separating it from neighboring rock—a vein or lode of quartz or other rock in place, enclosed or suspended between rock walls." Placer
claims include unconsolidated deposits of sand and gravel and also many non-metallic bedded deposits that are not subject to lode claims. The maximum size of a placer location is 20 acres (8 hectares) for an individual and 160 acres (64 hectares) for an association of not less than eight persons. Placer claims must conform with the U.S. system of rectangular grid surveys.

Claims may also be made for mill sites. A mill site may not exceed 5 acres (2 hectares) and is "required to be used or occupied distinctly and explicitly for mining and milling purposes in connection with the lode or placer claim with which it is associated."

When a claim on public land is patented, it becomes private property, and is taxed accordingly. In order to obtain patent, the claimant must have expended not less than $500 for the development of the claim. A survey of the claim must be made by a qualified mineral surveyor. The applicant must also pay a purchase price of $5.00 per acre for lode claims and $2.50 per acre for placer claims.

Claims in the Granite Mountains

Mining in the Granito Mountains has been quite limited. Prospectors have probably been in the area since the late 1800s, but no commercially important mining has taken place.

The history and present legal status of claims in the Granite Mountains are discussed here; the geology of the claims is discussed in Economic Geology, page 37. Mines and sections of land containing current mining claims are shown in the Mining Claims and Land Ownership map, page 205.

Patented Claims

The only patented claim in the Granites, the Iron Victory, is located near the summit of Silver Peak in Section 2 T8N R12E. The claim was patented in 1956, and is currently owned by Mabel Rayle and Isabel Wilson, et al. The principle ore mineral is magnetite. The claim shows little evidence of actual work, and has been developed only by small open cuts. A road leading to the claim from Cottonwood Basin is now washed out and is
impassable by four-wheeled vehicles.

Unpatented Claims

There are a number of current unpatented claims throughout the Granite Mountains (see Appendix H). The Golden Legend claims in Section 31 T9N R13E are located just north of the mouth of Cottonwood Basin within the proposed Research Natural Area. The claimant, Murray W. Kidder, located the Golden Legend on June 27, 1966 and the Golden Legend no. 2 on December 5, 1972. Kidder excavated open-cut pits for the location work on each 20-acre (4-hectare) claim, and constructed a cabin on one of the claims. These are the only claims in the study area that may have been active during spring, 1978.

The Silver Old, a 20-acre (4-hectare) claim located by Maybell Biggs on March 23, 1977, is also within the proposed Research Natural Area in Section 6 T8N R13E. The location notice is vague; it places the claim, "About 1 mile up Cottonwood Spring of Cottonwood Wash. About ½-mile westerly from 4620 marker."

Canceled claims in the Granite Mountains are so numerous that only those showing clear evidence of having been worked were investigated. Information on canceled claims is recorded by township and range at the San Bernardino County Hall of Records. There are no maps showing the locations of unpatented claims. These claims are generally not surveyed, and are not located accurately.

The two major canceled claims that show evidence of having been worked are the Silver Queen in Section 6 T8N R13E, and the Comanche in Section 26 T9N R12E.

The Silver Queen was discovered on May 12, 1932, and located on October 18, 1932 by Oscar L. Hoerner, Cliff Barnes, and Emory S. Baxter. The location notice reads: "Kelso Mining District. Located about 16 miles Southerly from Kelso Station on the Union Pacific Railroad. 1¼ miles Easterly from Cottonwood Springs."
We interviewed Emory Hoerner at his home in Rainbow Wells. Mr. Hoerner's father, Oscar Hoerner, was one of the claimants of the Silver Queen. Mr. Hoerner said that minerals found on the Silver Queen claim included "silver, copper, pyrites of iron, lead zinc, and gold."

A bucket on a cable carried ore down the mountainside to an arrastre—a dragstone mill for pulverizing ore. Mr. Hoerner said that the arrastre, now recorded as a BLM Historic Site, was built in 1934 or 1935 and powered with a "Chevy" engine. In addition to the concrete-and-stone arrastre, shafts, tunnels, tailings, cables, and tanks are still evident at the Silver Queen site.

The Hoerners worked the mine for 10 or 12 years; no proof-of-labor records for the Silver Queen are on file after 1945. The Hoerners' house on the claim burned several years ago.

The Southern Pacific publication, *Minerals for Industry* (1964), refers to a mine located in the same section as the Silver Queen as the "Pine Ridge Mine". The associated features are "pits and 200' adit with 50' raise to surface." This is probably the same mine.

The Comanche Mine was a copper mine, located March 1, 1958 by Peter A. Olson, Juanita R. Olson, and Ralph D. Layland. According to Dick Taylor (pers.comm. 1978), the Olson family sold a ranch in Wyoming and invested in the Comanche Mine. The venture was unsuccessful. *Minerals for Industry* states that the mine was active from 1957 to 1959.

There were several lodes claimed under the Comanche name. The location notices give the locations as ranging from 3000 feet to 5000 feet from Coyote Springs in a westerly direction. Comanche mines No. 9 and No. 10 were located "about 500 feet from the promontory known as ballance rock." Discovery work included several open cut excavations "at least 10 feet below the surface." No proof of labor was filed for the Comanche Mine in 1963-64, and the claim was canceled.

Two tunnels, tailings, and a structure still exist on the side of Playground Wash. An impassable road leads to the mine from Coyote Spring.
There are several old vehicles, a battered trailer, and some other debris scattered in the wash to the east of Playground Wash along the Comanche Mine road (Junk Car Wash). The debris includes items from the late 1950s and early 1960s.

The Bueno Suerte lode claims in Section 21 T9N R12E, located in 1972, also show evidence of having been worked. The records state that "discovery work [was] completed by core drilling". Bueno Suerte claims numbers 1 through 4 were canceled in 1973 when no proof of labor was filed. Numbers 5 and 6, located within the proposed Wilderness Study Area, are believed to be current.

**Present Policy**

During the period of review of potential Wilderness Study Areas mandated by the Federal Land Policy and Management Act of 1976, mining and mineral leasing will be allowed to continue "in the manner and degree in which the same was being conducted on the date of approval of this Act", provided that such uses do not impair the suitability of the lands for preservation as wilderness.

If a Wilderness Study Area is recommended as suitable for designation as wilderness, a mineral survey of the area must be conducted by the United States Geological Survey and the Bureau of Mines to determine the mineral values that may be present in the area.

Once an area is designated a wilderness area, it is subject to provisions of the Wilderness Act of 1964. Prospecting and mining may continue until midnight December 31, 1983 subject to such regulations as the Secretary of the Interior may prescribe for the protection of the wilderness character of the land consistent with the use of the land for mineral location and development.

All patents issued in wilderness areas convey title to the mineral deposits within the claim, but title to the surface is reserved by the United States. After December 31, 1983, no patents will be issued within wilderness areas, except for valid claims existing before December 31, 1983.
Effective January 1, 1984, minerals in wilderness areas will be withdrawn from all forms of appropriation under the mining laws. Valid rights then existing will remain valid.

The URA (BLM 1976a), states that the Granite Mountains area is "relatively poorly explored, but is known to have several identified deposits of the type which, with additional exploratory work, may prove to be of economic size."

The mineral value area identified by the BLM encompasses the northeast one-quarter of the Granite Mountains, from the top ridge line on the east to the bottom of the mountains. The BLM's draft East Mojave Management Framework Plan, Granite Mountains section, states that

a mineral area for iron and lead with a substantial probability for future development was identified over about 15% of the subregion. This area appears to be an extension of the area in which Kaiser Steel's Vulcan Mine, the largest producer in the planning area, is located.

However, the history of mining in the Granites suggests that the potential for economically significant mineral development is low.

The draft MFP gives the Granite Mountains first priority for roadless area review and wilderness inventory rather than mineral exploration and development. In addition, the MFP calls for withdrawal of the proposed Research Natural Area from mineral entry.
RECREATIONAL AND SCIENTIFIC USES

More than half of California's twenty-two million people live within a few hours driving time of the eastern Mojave Desert. In 1975, about 35,000 people visited the Bureau of Land Management's East Mojave Planning Unit, accounting for an estimated 44,000 visitor-use days spent in a broad range of recreational activities (BLM 1976a). This BLM estimate, compiled from aerial flights and limited on-the-ground observations, is relatively low compared with figures for other, more heavily used areas of the California desert. However, the pressures of population growth and urbanization have only recently prompted large numbers of Californians to utilize the California desert for outdoor recreation; use can be expected to increase.

Scientific and educational use of the desert is also increasing rapidly. Universities, colleges, and secondary schools are making use of this natural laboratory more than ever. The eastern Mojave, in particular, is well known for its natural values; the attention of many scientists and educators is focused on this region and on the Granite Mountains.

Recreational Use

According to BLM figures, the Granites received medium annual use and moderate use intensity. In 1975, an estimated 771 visitors spent about 2252 days in the area (BLM 1977c). Known recreational activities include rock collecting, deer and upland game hunting, sightseeing, camping, hiking, desert-peak climbing, painting, and photography. During a two-month period, we observed approximately 339 visitors in the Granites, spending an estimated total of 635 days in the area; we noted the additional activities of rockclimbing, off-road vehicle (ORV) use, and recreational shooting. We identified and mapped several frequently used primitive campsites and fire-ring rites, plus the small "Cottonwood Cabin," a shack apparently built and used by recreationists (see Recreational Sites map, page 223).

Using a standardized rating scheme, the BLM Desert Plan Staff (DPS) rated the Granites excellent for scenic quality, based on "appealing rock
outcroppings, varied plant life, and few intrusions," (BLM 1976b). Planners rated the area fair for geologic sightseeing, good for botanical sightseeing, and good to excellent for zoological sightseeing.

Bureau of Land Management surveys rate deer hunting in the Granites as medium and upland game hunting as excellent. The California Department of Fish and Game introduced deer into the area in 1948. Only 11 deer have been shot in the Granite and southern Providence Mountains since deer hunting began, and BLM surveyors recorded only one person hunting in the area in 1975. In three months of field work, we observed only one set of deer tracks and no deer in the Granites. However, in public participation sessions, hunting groups have expressed the concern that the Granites should be maintained for hunting (BLM 1977c).

In a 1977 survey conducted by the Environmental Information Service for the BLM, six organized groups reported that they used the Granite Mountains: the Desert Peaks Section of the Angeles Chapter and the Mojave Group of the San Gorgonio Chapter of the Sierra Club, Rancho Santa Ana Botanic Gardens, Society for the Conservation of Bighorn Sheep, Citizens for a Mojave National Park, and the Southern California Council of Conservation Clubs. Three groups listed backpacking as a major club activity in the Granites; one group each chose plant study, mammal study, natural and cultural site survey, and natural and cultural site protection. User groups mentioned the scenery, geology, and wildlife of the Granites as important attributes of the area (Environmental Information Service 1977).

The interest in backpacking is, in itself, a special characteristic of the Granite Mountains. The East Mojave Planning Area Analysis (BLM 1977c) reports that backpacking and hiking, not generally thought of as desert recreational activities, are becoming conspicuous activities in the Granites. The BLM East Mojave Unit Resource Analysis (1976a) lists the Granites as one of the few presently used areas with backpacking potential, and notes that the Granites are one of the four known rockclimbing areas in the East Mojave Planning Unit. The "White Fang" pinnacle in Section 17
T8N R13E in the southeast Granite Mountains is a renowned climbing spot. Sierra Club climbing trips visit the area, and a Riverside, California mountaineering shop has distributed a mimeographed climbing-route description for the Fang. Granite Peak no. 1, at 6786 feet (2068 m), is a Class 2 peak on the Sierra Club Desert Peaks List—one of the five Desert Peaks in the East Mojave Planning Unit. The register on the top includes names from several Sierra Club and Scout outings that took various routes to the peak.

**Scientific and Educational Uses**

The same geologic and biologic diversity that attracts backpackers and hikers to the Granites has attracted scientists and educators to use the region as an outdoor laboratory and classroom. Stebbins, Papenfuss, and Amamoto (1978) estimated that research and teaching occupy a minimum of 256,892 person-days each year in the California desert. Education and research are dominant uses of the East Mojave Planning Unit, accounting for 4947 visitor-use days in 1975—second only to camping in total visitor usage.

With 658 scientific and educational visitor-use days in 1975, the Granites are one of the ten most used areas in the California desert. A 1977 BLM survey listed nine colleges and universities and three secondary schools that visited the Granites in 1976. Twelve institutions reported their use of the Granites to the Stebbins group. During our field work, we observed four college and university classes, one secondary school class, and one unidentified field class in the Granites—and three additional classes in the adjacent Kelso Dunes. We also saw two groups of botanists and one team of entomologists working in the area.

With this pattern of primitive recreation and scientific usage in mind, the Stebbins team (1978) concluded that the Granites, as part of the Kelso Basin—the California desert area most frequently used by school groups—should be preserved for wild land values and long-term use for non-mechanized recreation, teaching, and research.

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The White Fang pinnacle, a prominent landmark in the southeastern Granites, is sometimes used by rockclimbers. Photo by B. Stein.

The Comanche Mine, located in Playground Wash, was active from 1957 to 1959. Photo by B. Bannerman.
Perhaps in anticipation of increasing recreational pressure, on May 1, 1972, Secretary of the Interior Rodgers Morton officially designated 19 California Desert National Recreation Lands, declaring that these lands held superior scenic, botanical, zoological, geologic, or historic values and had recreation as a major use. The Granite Mountains, mainly public land administered by the BLM, were within one of these parcels—the East Mojave National Recreational Lands. The order establishing these areas (PLO 5224) mandated that these lands be managed under the principles of BLM multiple-use management, but with recreational use as a major consideration.

This action placed land in the Granite Mountains into two different Outdoor Recreation classes. Granite Pass, a potential campground, belonged to Class II: "General outdoor recreation area subject to substantial development for a wide variety of specific recreational uses." During the late 1960s, BLM had planned to develop campgrounds at Snake Spring and at Granite Pass. The Snake Spring plans, opposed by a group of avocational archaeologists because of the cultural sensitivity of the area, were never pursued; Granite Pass remained a recommended site in the 1977 BLM draft Management Framework Plan.

The law declared most of the rest of the Granites a Class V Primitive Area:

Extensive natural, wild and undeveloped areas and settings essentially removed from the effects of civilization. Essential characteristics are that the natural environment has not been disturbed by commercial utilization and that the areas are without mechanized transportation.

According to a Federal Register report, the land was withdrawn from all forms of appropriation under the public lands laws . . . for protection of recreation and public values.

The region had been identified as a potential natural area and an area of scientific importance that merits special attention and care in management to insure preservation in the natural condition.

This action made most of the Granites eligible for BLM designation as
Research Natural Area, Outstanding Natural Area, or Scenic Corridors and Buffer Zones.

On October 21, 1976, four and one-half years after Morton's Public Land Order, the president signed the Federal Land Policy and Management Act of 1976 (FLPMA). The act replaced many of the 2500 laws pertaining to public land management and affected nearly every phase of BLM operation. The act established goals and guidelines for resource inventory, land-use planning, and resource management. Most important for the Granite Mountains, Title VI of FLPMA set up the California Desert Conservation Area (Section 601) and directed a review of all BLM lands for potential wilderness status (Section 603).

In Title VI, Section 601, Congress declared that the California desert contained natural, cultural, and economic resources uniquely located adjacent to a population center; that the desert is an extremely fragile, easily scarred and slowly healed total ecosystem; and that the desert resources are threatened by inadequate federal management authority and the pressures of increased use—pressures certain to intensify given the rapidly growing population of southern California. Therefore, to protect and administer these public lands "within the framework of a program of multiple-use and sustained yield, and the maintenance of environmental quality," Congress established the California Desert Conservation Area. This area includes 12.5 million acres of BLM land and 12.5 million acres of interspersed private and public land—almost one-fourth of California.

The Federal Land Policy and Management Act of 1976 directed the preparation of a "comprehensive, long-range plan for the management, use, development, and protection of the public land within the California Desert Conservation Area," to be prepared in accordance with Section 202 of FLPMA (a section delineating BLM inventory and planning techniques). The California Desert Conservation Area Plan is to be completed and implemented on or before September 30, 1980. This plan will replace both the "interim critical management program" developed in the early 1970s in response to a
"resource emergency" resulting from increasing and conflicting uses of the desert, and the program of interim management authorized by FLPMA for the four years between the passage of the act and the completion of the plan (BLM 1977a).

To take on the huge task of conducting resource inventories and making land-use allocation plans for 16 million acres of land (12.5 million acres of BLM land plus 3.5 million acres of private in-holdings) in less than four years, the Secretary of the Interior set up the California Desert Plan Staff (DPS). The act authorized up to $40 million, but actual appropriations are much lower; in 1977, the total cost was estimated at $10 million. The DPS timetable calls for the staff to gather resource inventory data until the end of 1978, then spend the final two years analyzing the data and drawing up recommendations.

As part of the data gathering process, the Desert Plan Staff inventoried resources in each BLM planning unit. The East Mojave Planning Unit Resource Analysis includes resource information about the Granites. From this baseline, BLM resource specialists made management recommendations for the area. These recommendations and the BLM Area Manager's analysis and recommendations are included in the draft East Mojave Management Framework Plan, step II (MFP).

The draft MFP, released in September 1977, recommends that the western two-thirds of the Granites be designated a Wilderness Study Area and that the eastern one-third—the Cottonwood and Cove Spring areas—be designated a Research Natural Area (RNA). The plan calls for removal of mining, grazing, and burro activity from the mountains. Two campgrounds are proposed to serve the users of the wilderness: one at Granite Pass, and the other near the Kelso Dunes. The draft MFP calls for hiking access into the interior of the wilderness area via a trail from the Granite Pass campground through the Research Natural Area.

The Management Framework Plan, step III, which includes resource decisions made by the Riverside District Manager, will be released after
publication of the California Desert Conservation Area Plan in 1980. In an unpublished draft version of the final MFP, the District Manager has vetoed the construction of both campgrounds and the proposed wilderness access trail. However, the District Manager supports continued public vehicle access into the proposed Research Natural Area.

Procedures for Wilderness Designation

The Granites could be included in the National Wilderness Preservation System as a result of a second crucial section of FLPMA (Section 603). This requires an inventory and review of all roadless areas with 5000 acres or more of public lands to determine the suitability of these areas for wilderness status.

The review will consist of three phases. First, BLM will conduct a Wilderness Inventory, a preliminary identification of roadless areas with wilderness characteristics. On the basis of this inventory, the Bureau will designate Wilderness Study Areas for the California Desert Conservation Area. The Desert Plan Staff will then conduct a study of each area to determine which Wilderness Study Areas are suitable for wilderness designation. The BLM will solicit public input at all junctures in this process. Finally, the BLM will recommend to the president those study areas found suitable for wilderness status. Presidential recommendations will be sent to Congress for final Wilderness Area determinations.

Until Congress enacts these Wilderness decisions, FLPMA provides that BLM shall manage the Wilderness Study lands in a manner that will not impair their wilderness values, and shall act to prevent unnecessary resource degradation and to afford environmental protection. However, the act allows for the continuation of existing mining and grazing uses and mineral leasing in the manner and degree in which these uses were being conducted in October 1976. FLPMA directs that once an area has been designated as Wilderness, sections of the Wilderness Act of 1964 describing administration and use of National Forest Wilderness Areas will apply to
the new BLM areas.

To fulfill the FLPMA requirement to inventory large roadless areas, the Bureau needed a formal and consistent definition of a road. Interior Department lawyers (BLM 1978b) have defined "road" as an access route that has been improved and maintained by mechanical means to insure relatively regular and continuous use. A way maintained solely by the passage of vehicles does not constitute a road. The phrase "improved and maintained" means that actions have been and will continue to be directed to physically keep the road open to traffic.

"Relatively regular and continuous use" is use by vehicles having four or more wheels which has occurred and will continue to occur on a recurring basis, for a predetermined, planned or intended purpose.

These definitions are important in the California desert, an area crisscrossed with jeep trails and paths currently used by off-road vehicle enthusiasts. The definitions allow for more roadless areas (potential Wilderness Areas), since abandoned roads or trails used solely by recreationists do not meet the criteria.

Once roadless areas are identified, FLPMA Section 603 requires that the areas be checked against criteria described in Section 2(c) of the Wilderness Act of 1964 (78 Stat 890; 16 USC 1131) to determine wilderness suitability. Section 2(c) provides:

A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its prim- eval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical values.
As BLM (1978a) defines "naturalness", a natural area must generally appear to have been affected primarily by the forces of nature. Man's work must be substantially unnoticeable. It must retain primeval character. It should be an area where the earth and its community of life are untrammeled (unencumbered/unconfined) by man and his activities. Designated wilderness may include some man-made features provided the impacts of such features are substantially unnoticeable and they do not require motorized equipment or mechanical access.

The BLM guidelines specifically mention some allowable intrusions, including communication or repeater sites and water-related facilities, such as developed springs. In judging wilderness suitability, the key factor will not be the mere presence of human intrusions, but rather their effect on the landscape.

Wilderness Values of the Granite Mountains

The Bureau of Land Management's Draft Wilderness Inventory (BLM 1978b) defines most of the Granite Mountains region as a roadless area that contains wilderness values meeting the criteria described in Section 2(c) of the Wilderness Act.

The Granite Mountains are included in Roadless Area 256 of the California Desert Wilderness Inventory. This area covers the entire Granite Mountains except for the eastern bajada and portions of the southern bajada. The area includes the northern bajada and extends west as far as Ludlow, encompassing the Old Dad Mountains and part of the Bristol Mountains. The BLM Wilderness Inventory Team states: "This area generally retains its primeval character. Man's impacts, which include a few unimproved ways to abandoned mines, mining shacks, and old corrals, are substantially unnoticeable; . . . opportunities for a primitive and unconfined type of recreation are outstanding."

Other BLM documents extoll the wilderness values of the Granites. The Unit Resource Analysis (BLM 1976a) rates the Granites excellent for primitive values. The study describes the Granites as pristine or nearly so, with minimal evidence of human activity and high freedom from outside
intrusions. The Management Framework Plan (BLM 1977b) says that the substantial wilderness characteristics of the Granites rank the area as one of the finest in the California desert. The Planning Area Analysis (BLM 1977c) notes significant scenic, cultural, botanical, zoological, and geological features in the Granites. One BLM decision maker, describing the high wilderness values in the Granites and the extensive support for such status called the range an "ice cream wilderness." After spending a spring in the Granites, we concur that this area exhibits significant wilderness values.

The Granites are not totally untouched by humans, however. Cattle have grazed all accessible portions of the mountain mass for at least the past 75 years, and two small mining operations have left scars near Cottonwood and Coyote Springs. Quite a few desert roads cross the bajada, and ORV tracks continue up washes. Shotgun shells and beer cans dot even some of the remote canyons. The freeway and the power lines are visible from the higher peaks, creating visual boundaries that somewhat diminish the sense of isolation.

Aside from being visual intrusions, both ORVs and aircraft cause occasional noise problems. Two instrumental flight plan aviation routes pass directly over the Granites; however, activity is light. On the busiest day of 1977, 18 flights crossed the area. Five of those operated between 9000 and 18,000 feet above sea level; the rest were higher. A busier route passes north of the Granites over the town of Kelso. Sixty-one flights took that route on the busiest day of 1977. A military training route traverses the region from south to north, following the Kelbaker Road. The Federal Aviation Administration estimates that this route is flown between 35 and 50 times each year, normally by two aircraft at a time (pers.comm. Davis 1978). The military planes operate at any altitude from the surface up to 8000 feet.

Frequently during our study we heard the noise of large jets, helicopters, and light private planes. Some of the flights crossing the Granites
A granite buttress above Dripping Spring. Photo by B. Stein.
and many of the jets travelling the training route caused loud, jarring sonic booms. Also, motorcycles and other ORVs become mobile noise sources on the area's roads. These noises detract from the desert solitude, forming an irritating contrast with the natural sounds of the wilderness. Removal of ORV use, and realignment of the aircraft routes could ameliorate these intrusions.

These human intrusions are annoying because of their contrast with the area's natural grandeur. The formidable forces of nature in the region dwarf the few human modifications. The human intrusions, concentrated to a large degree on the bajada at the base of the mountains, are mainly those mentioned by BLM as allowable in a wilderness, namely, water improvements, weathered corrals, and old fences. Compared with the scope and power of the natural scenery, the effect of these intrusions is minimal. Our resource inventory has shown us the exceptional natural and cultural features of scientific, educational, scenic, and historical value—features enumerated in other sections of our report. In short, we know that the Granite Mountains fit the prescribed criteria and strongly recommend the area for wilderness designation.

Research and Natural Area Qualities

The same pristine conditions that inspire primitive recreation have long brought scientists and educators to the Granite Mountains. Some of these researchers and teachers have sought a special status for the Granites to insure the protection of its relatively pristine nature. An effort begun in the early 1960s by Dr. Kenneth S. Norris to place the Granites in a teaching and research reserve came to at least partial fruition in May 1978 when the University of California Natural Land and Water Reserves System purchased three sections of land in the eastern Granite Mountains (see Mining Claims and Land Ownership map, page 205).

In 1965, the Board of Regents of the University of California officially established the Natural Land and Water Reserves System (NLWRS) to preserve examples of the major habitat types in California for teaching and
research purposes. Prior to the system's official creation, Dr. Norris and an ad hoc committee of fellow scientists made an initial survey of California for possible reserve sites. This initial list, drawn up in 1962, included the Granite Mountains (Norris 1974). Since that time, officials of the NLWRS have tried to obtain land in the Granites for the reserve. Finally, the NLWRS received the necessary gift funds and was able to negotiate the purchase of three sections of land (1848 acres, 752 hectares) from the Southern Pacific Land Company.

Since these three sections are not contiguous, their management as a functional reserve hinges on BLM choices for the surrounding public land. In the late 1960s, the NLWRS began advocating establishment of a BLM equivalent of a wilderness area in the Granites. Several times officials and representatives of the reserve system met with the BLM administrators and submitted written proposals.

Bureau of Land Management plans for the Granites expressed in the East Mojave draft Management Framework Plan encompass some of the ideas set forth by the NLWRS. The bulk of the mountain mass is proposed as a potential Wilderness Study Area; the Cottonwood Basin "Central Enclave" of the Granites, surrounding the NLWRS land, is proposed as a Research Natural Area. Bureau of Land Management planners (1977b) have expressed the need for proper management to insure the integrity of the RNA:

The Research Natural Area has been identified as a needed addition to the University of California ecological preserve system, and as such should have only very closely controlled intrusions by people or domestic or feral animals.

The Federal Committee on Ecological Reserves (1977) has provided guidelines for all federal land-managing agencies in the selection, classification, establishment, protection, management, and use of Research Natural Areas. The committee defines a Research Natural Area as "a physical or biological unit in which current natural conditions are maintained insofar as possible." The objectives of these areas are to preserve adequate examples of all major ecosystem types or other outstanding physical or biological phenomena; to provide research and education opportunities for scientists
and others in the observation, study and monitoring of the environment; to preserve the full range of genetic and behavioral diversity for native plants and animals, including rare, endangered, or threatened species and disjunct populations; and to provide a basis for organized research and exchange of information on Research Natural Areas.

The BLM has few firm policies on RNA management. Subpart 6225 of Title 43 of the United States Code of Federal Regulations sets out general definitions and policies for establishing various natural areas, including Research Natural Areas. Research Natural Areas are established and maintained for the primary purpose of research and education. . . . The general public may be excluded or restricted where necessary to protect studies or preserve Research Natural Areas.

The RNA candidate areas must be on land formally withdrawn from the public domain (43 CFR 2300) or classified for retention in federal ownership under the Classification and Multiple Use Act of 1964. Final establishment of the Research Natural Area is accomplished by administrative action (43 CFR 2072) published in the Federal Register (Cheatham et al. 1977). The BLM Manual Supplement to Subpart 6225.06 provides that use of RNAs by educational or research institutions will be authorized by a memorandum of understanding or cooperative agreement.

Under Subpart 6250.06 of Title 43, the bureau may restrict the lands, roads, and trails to specified authorized use, or no use, in the interest of protection or preservation of the land. Further, emergency regulations (43 CFR 6010.4) used in formulating the California Desert Interim Critical Management Plan authorize closures or travel limitations in order to protect scientific studies or preserve scientific values (BLM 1977c). Thus BLM regulations exist to allow restrictions on use of the RNA and careful management to preserve the resources.

Other Proposals

The BLM and the University of California are not the only parties interested in the management of the Granite Mountains area. On a county level, San Bernardino County has designated the Kelbaker Road as a potential
scenic route; establishment of the route will require cooperation with BLM to "maintain continuity of visual corridors," and "eliminate and/or prevent any unsightly development," (BLM 1976a).

State-wide groups and agencies have expressed interest in the Granites. The California Natural Areas Coordinating Council (CNACC), a council of representatives of nature reserve programs formed to coordinate California reserve activities, included the Granite Mountains on their list of 1300 areas with nature reserve values. The council selected areas based on criteria used by the National Park Service in its determination of national landmarks, substituting the requirement that areas be of state or local, rather than national, significance (Cheatham et al. 1977).

The California Department of Fish and Game had proposed that the Granites make up part of a special area managed to protect and preserve its natural resources. Further, the California Department of Parks and Recreation identified the area within the East Mojave Planning Unit as having the potential for a large state or national park (BLM 1977c). A National Park Service (1976) survey of the Mojave and Sonoran deserts named six potential National Landmarks in the eastern Mojave, including the Granite Mountains Pediment—14 square miles on the eastern side of the Granites, from Willow Spring to Granite Pass.

In the late 1970s, several individuals began a drive to establish a Mojave national park. Two organizations formed the Mojave National Park Coalition in 1976; in 1978, seventeen groups, including the Sierra Club, Friends of the Earth, and the California Native Plant Society made up the coalition. An educational group, Citizens for a Mojave National Park, formed in 1977 to publicize the perceived need for protection of the area as a national park. The group argues that BLM multiple-use management will not provide sufficient protection for the desert. The group proposes a 1.5-million-acre park that includes the Granite Mountains. According to their plans, private inholdings would remain, and some mining and grazing would continue within the park (Citizens for a Mojave National Park 1977).
State and national public opinion polls suggest that the public, in general, would support moves to preserve the California desert. In a 1975 Field poll conducted for the BLM, Californians "expressed strong protective sentiments regarding the California desert," ranking "more protection of important historical areas," and "less development of all kinds" as the most important issues of citizen concern. Both desert users and people who never use the desert expressed strong concerns about protection of the California desert (BLM 1977c).

A 1978 nationwide Gallup poll (Gallup Organization 1978), also commissioned by BLM, showed strong support for preservation of California desert land and opposition to development; again both frequent desert visitors and those who had never been to the desert expressed these views. The highest net levels of support were in favor of protecting wildlife and ecology (80%), protecting the scenery and natural character of the land (71%), and protecting areas of historical importance (65%). Greatest opposition was toward commercial development (41%), mining (27%), and off-road vehicle use (23%).

Given this apparently widespread sentiment, coupled with our specific knowledge about the uniqueness, diversity, and grandeur of the Granite Mountains, we argue that the Granites deserve special protection. This area demands the special planning described by the Stebbins team (1978):

It may be necessary to re-examine the multiple-use concept as applied to open natural terrain such as is found in arid lands. It is not possible, in our judgement, to protect wild land values while at the same time allowing a geographically fine-grain interplay of many uses. The broad desert expanses, notable for their silence, the delicate and precariously situated biota, the lack of screening vegetation . . . all call for special planning.

We concur with the BLM, NLWRS, National Park Service, CNACC, and Citizens for a Mojave National Park that the Granites merit special designation and preservation for primitive recreation, research, and education.
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