ENVIRONMENTAL ASSESSMENT

of the

US SPRINT FIBER OPTIC CABLE PROJECT

Rialto, California to Las Vegas, Nevada

Prepared for:

USDI BUREAU OF LAND MANAGEMENT

January 1988

ENVIRONMENTAL ASSESSMENT OF THE US SPRINT COMMUNICATIONS COMPANY FIBER OPTIC CABLE PROJECT RIALTO, CALIFORNIA TO LAS VEGAS, NEVADA

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USDI Bureau of Land Management

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SUMMARY

US Sprint Communications Company proposes to install approximately 230 miles of buried fiber optic telecommunications cable and 10 repeater stations from Rialto, California to Las Vegas, Nevada. This project would complete another link in the US Sprint's nationwide network.

Alternatives considered included the no-action alternative, cable installation in the existing utility corridor known as the Boulder corridor, and installation in the transportation/utility corridor paralleling Interstate 15. The no-action alternative would preclude any environmental impact associated with the proposed project, but would prevent US Sprint from completing a portion of its telecommunications system. The Boulder corridor was not favored by US Sprint or BLM, due to physical problems of installing this cable in areas of existing disturbance through the corridor's rugged terrain. Therefore, US Sprint delineated a cable route generally paralleling Interstate 15. BLM requested a number of revisions to move this route into existing road and utility rights-of-way and areas of previous disturbance. The proposed action, as revised, minimizes environmental impacts because all but several miles of the 230-mile route are within existing disturbance areas.

Environmental resources inventoried along the proposed route include geology, soil, hazards, water resources, biological resources, land use and jurisdiction, and visual, cultural and paleontologic resources. The proposed project will cause some adverse effects; however, none is expected to be significant. Construction methods and timing, along with recommended mitigation measures, will minimize impacts from soil erosion, disturbance to flora and fauna, visual effects of repeater stations, and disturbance to cultural resources. Permitting agencies and other affected parties will be consulted as appropriate to review mitigation measures in specific areas. Most residual impacts, after mitigation, will be short-term and minor in areal extent. Long-term impacts will include visual effects of repeater stations, and the removal of land at repeater station sites from productivity. Potential impacts on biological and cultural resources are expected to be very limited, due to avoidance, surveys, testing and/or construction monitoring in specific, sensitive areas.

The project will have a beneficial impact on affected counties, from payment of property tax revenues, and may have a slightly beneficial effect on regional or national long-distance telephone rates through competition.

CHAPTER I - PURPOSE AND NEED FOR ACTION

Governing federal authorities have deregulated the long-distance telecommunications market to introduce competition and economies of scale for the public good. US Sprint Communications Company is currently engineering and constructing a nationwide system of all digital, fiber optic communication lines that will eventually provide alternative long-distance services to subscribers in all major urban areas in the United States. The proposed cable from Rialto, California to Las Vegas, Nevada will complete another link in this nationwide system.

Fiber optic technology has two major advantages over other communication systems: it provides a higher quality of sound and digital data transmission than conventional systems, and it is capable of transmitting much more information per cable than copper.

CHAPTER 2- ALTERNATIVES INCLUDING THE PROPOSED ACTION

NO ACTION

If no action were taken, US Sprint would not install its fiber optic cable and ancillary facilities between Rialto and Las Vegas. While the no-action alternative would preclude environmental impacts associated with project construction, it would prevent US Sprint from completing a portion of its telecommunications network.

ROUTING ALTERNATIVES ELIMINATED FROM DETAILED EVALUATION

Routing alternatives outside of existing road/utility corridors were considered impractical. The environmental impacts of such routing would be greater than that of using previously disturbed corridors. Additionally, construction in undisturbed areas would necessitate building or upgrading access, which would add significantly to the enviromental impacts and costs of project completion.

Two primary corridors were considered for the cable route: the Interstate 15 corridor and the "Boulder" transmission line corridor.

The Boulder corridor is an existing utility corridor running north of and roughly parallel to Interstate 15 in the project area. The corridor contains high-voltage transmission lines and a recently installed telecommunications cable. This alternative was considered but eliminated from detail study for several reasons. It would be very difficult to install a second telecommunications cable along the existing access road. Space is very limited due to rough terrain, existing transmission and telecommunication lines, and the restrictions of adjacent Wilderness Study Area boundaries. Disturbance outside of the access way could result in higher impacts, due to many areas of steep terrain.

PROPOSED ACTION

It was determined that the only practical alternative was to route the proposed cable along existing transportation and utility corridors to minimize environmental effects of project construction. Therefore, US Sprint, proposed a route closely paralleling Interstate 15. The initial route was reviewed by BLM, and a number of route revisions were requested by the Needles and Barstow BLM Resource Area offices. These revisions moved the cable route into existing road rights-of-way, generally in an existing access road along a Southern California Edison 138kV transmission line.

Project Components

US Sprint is proposing to install a buried telecommunications fiber optic cable within existing rights-of-way from Rialto, California to Las Vegas, Nevada (see Figure I and the maps at the end of this document). Major project features will include approximately 231 miles of buried cable and 10 repeater stations located along the right-of-way at 20- to 23-mile intervals. Repeater stations serve to regenerate the light signal as it travels through the fiber optic cable.

Repeater stations will have electrical power needs which, in some cases, will be met by existing overhead power lines. In other instances, new distribution line will be needed to deliver power to a station. Table 2-1 lists the approximate distances from repeater stations to existing power sources. Such lines would be about 7.2 kilovolts and can be buried.

The location and design of these distribution lines will be determined by the local power supplier. Therefore, all permits and other clearances for the lines will be the responsibility of the power supplier.

Project construction is scheduled to begin in January 1988, and will take about four months to complete. The project will require a 10-foot-wide permanent right-of-way and an additional 10-foot-wide construction right-of-way. Existing roads will be used for access to the right-of-way and all repeater stations.

The cable will be 0.5 inch in diameter, outwardly resembling a traditional copper-core telephone cable. Its glass fibers will be encased in a flexible steel sheath covered with a waterproof plastic coating. Once buried, the cable will be inert, emitting no electrical current, sound or chemical. Above-ground cable warning signs will be placed along the route at 1,000- to 1,200-foot intervals, and to mark railroad and public road crossings and splice points.

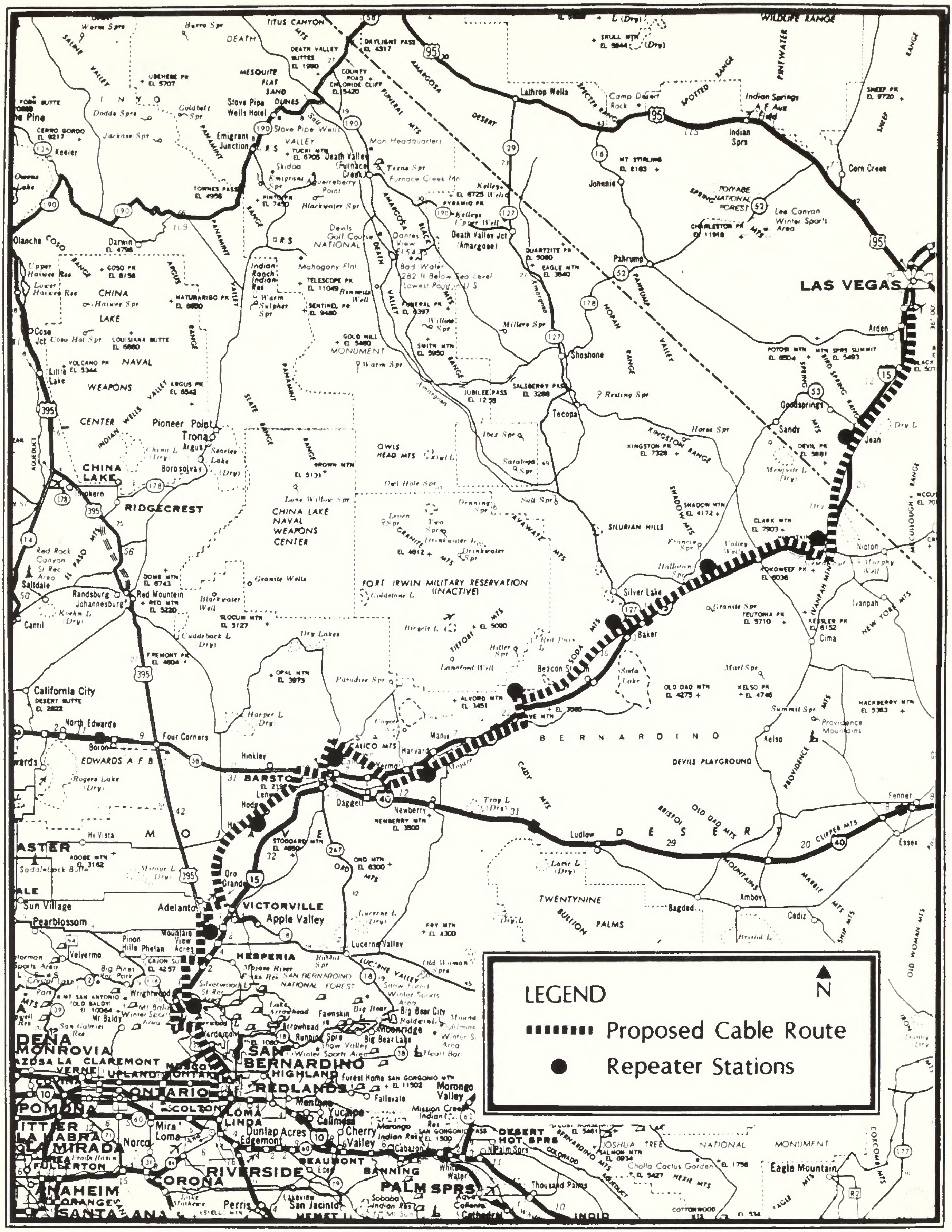
Repeater station huts will be above ground, concrete and aggregate, pre-cast structures measuring 8.5 feet by 12 feet, standing 8 feet high. All stations will be located adjacent to existing roads. No new access roads will be required.

Each repeater site will include a standby generator, to be placed on a 3-foot by 6-foot fabricated steel frame which will rest on a 5-foot by 8-foot concrete pad. The fabricated steel sub-base will also serve as the fuel storage tank. Plate steel will be welded to the I-beam sections to form an 80-gallon, dual wall enclosure for the diesel fuel. The limited tank exposure, combined with the 3/16-inch I-beam thickness around the tank perimeter, will provide excellent protection. A low-fuel alarming device will also be installed to signal operations personnel in the unlikely event of a fuel leak. The generators will be 9kW in size, and will be run for 15 minutes per week to ensure they remain in good working condition. The generators will not increase ambient noise levels to any significant degree.

TABLE 2-1
APPROXIMATE DISTANCES FROM REPEATER STATIONS TO POWER SOURCES

Repeater Station*	Distance to Power Source
#1 - Devore	Power available at site
#2 - Highway 395	Power available at site
#3 - Rodeo Road	Power available at site
#4 - Irwin Road	585 feet
#5 - Yermo Road	170 feet
#6 - Afton Crossing	7,600 feet
#7 - Baker	1,250 feet
#8 - Halloran Summit	1,985 feet
#9 - Nipton Road	1,225 feet
#10 - Jean	40 feet

*Repeater station locations are shown on the maps at the end of this document.



US SPRINT
Rialto-Las Vegas Fiber Optic Cable Project
General Project Area

FIGURE 1

Generators will be enclosed in a concrete and aggregate hut similar to the repeater station huts. The generator huts will measure 8' 10" by 10' 10", and stand 8 feet high. Both the repeater and generator huts will have aggregate surfaces and be tan in color. The doors and metal trim will also be tan.

A total area of 625 square feet (25 feet by 25 feet) will be fenced with chain link fencing at each repeater site.

Figure 2 illustrates a typical repeater station site plan. A more detailed floor plan of a repeater station is shown in Figure 3.

Construction Methods

Within the right-of-way, the cable will be buried to a minimum depth of 42 inches (maximum depth of approximately 60 inches) by a number of different methods. The principal means of burial will be "plowing" with a cable plow. The plowing operation involves two bulldozers and a number of support vehicles (typically three) such as pickup trucks and crew vans. The first bulldozer will pull a ripping bar designed to slit the soil in a trench 3 to 4 inches wide and 42 inches deep. The soil will not be removed from this trench but a small amount will be displaced as the bar is pulled through. A second bulldozer with the cable plow and cable will follow the ripper. The plow will lay the cable in the pre-ripped trench, again without removing any soil other than that which is displaced. Vertical mixing of the soil will be minimized, as neither the ripping bar nor the plow will move appreciably in a vertical direction. The cable will be installed by plowing for a majority of the route. Figure 4 shows typical cable placement by plowing and trenching in a road right-of-way. Trenching and cable laying equipment will be of adequate size and power to accomplish the work with one pass and with no track or wheel slippage. This will minimize soil and vegetation disturbance.

A second method of burial is simple trenching. A rubber-tired trencher would be used to excavate the trench in urban areas and locations where the terrain is too irregular for the bulldozer and plow. Trenching would also be done with a 12-inch or 18-inch backhoe in some areas of irregular terrain (see Figure 4). The cable will usually be buried up to 60 inches deep in those areas. The trench will be excavated just prior to installation of the cable, and it will be back-filled the same day. Hand trenching may be used in some areas. Generally, this is done in locations where wet conditions prevent the use of heavy equipment.

The third method of cable placement, jack and bore, is used only where cable must be placed under an obstacle and no disturbance of the ground surface is allowed. Areas to be jacked or bored include road crossings and narrow water crossings or other areas as required. The jack and bore method is restricted to short lengths, typically no longer than 200 feet. The first technique used in this method jacks or pushes a casing between two small pits dug at each end of the crossing. The second technique connects the two pits with a hole provided by an augering or boring device. Since the majority of the ground surface above the crossing is undisturbed, only restoration of the pit areas is required.

Rock trenching may be used in areas of coarse gravel or rock where a wider trench is required. A rock trencher has a backhoe a maximum of 24 inches wide. The width of a rock trench would depend on the nature of the substrate; wider trenches with more gradually sloping sides would be required in areas of less consolidated soils.

The cable may also pass through bedrock, necessitating the use of a rock saw which would cut a trench 4 inches wide and up to 42 inches deep. Rock sawing is slower than plowing or trenching, so it would be done in advance of the cable-laying operation to avoid delays. No bedrock trenches would remain open for more than one day.

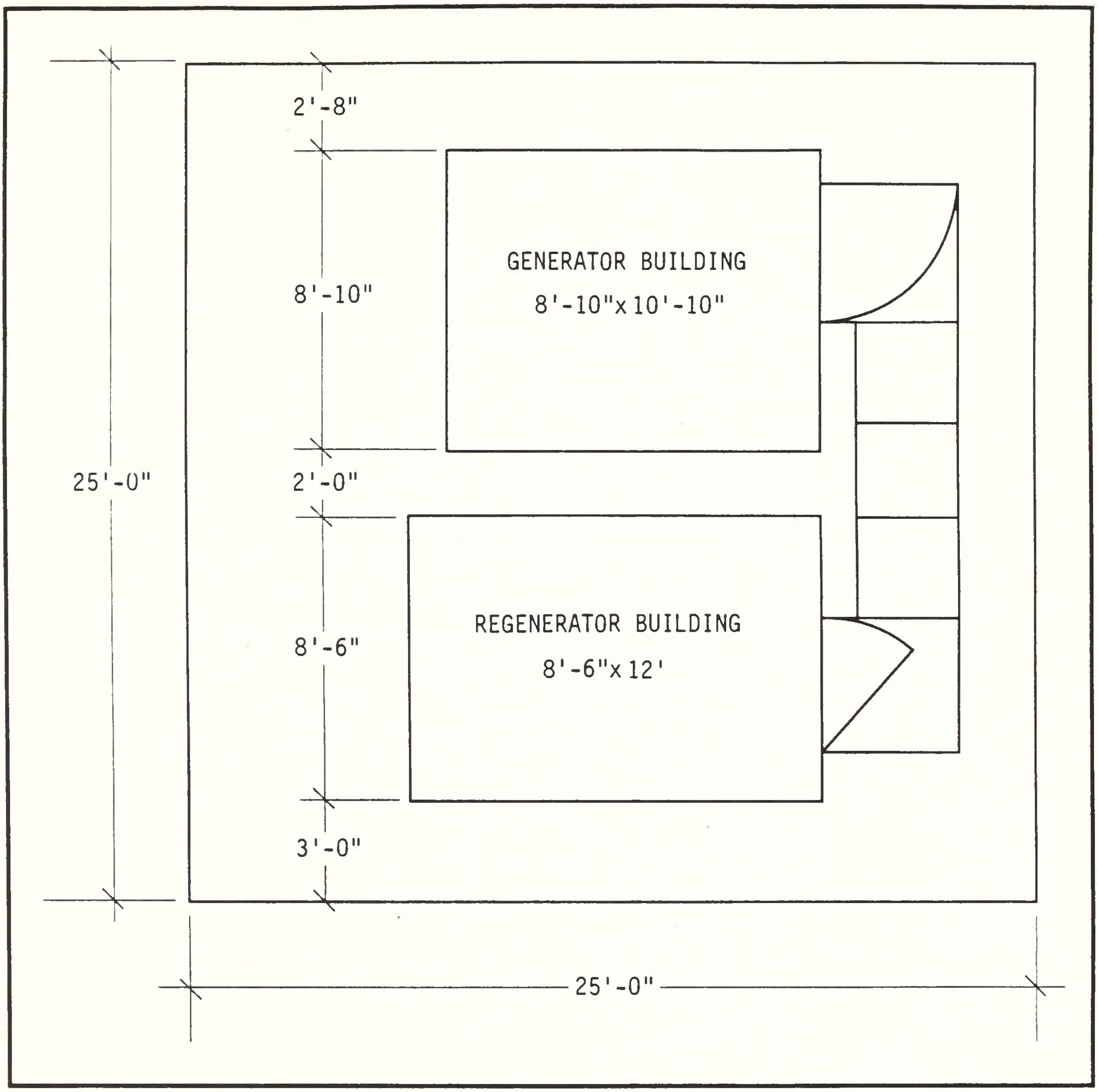
A number of perennial and ephemeral streams and rivers will be crossed. Where a steel bridge exists at a river, the cable is attached to the bridge structure in conduit. Where a culvert exists, the cable can be placed over or under the culvert. No construction activity takes place in the water where bridge attachments or culverts are used.

Where no bridge or culvert exists (some ephemeral streams and dry washes), the cable will be placed in the stream bottom either by direct burial or jack and bore, as appropriate. Generally, where the bottom is silt, the cable is plowed across to a depth of 42 inches or deeper. The cable is usually placed in conduit for protection.

Roads, streets, irrigation ditches and canals are bored under. The bore is generally made at a depth of 42 inches below the bottom of the borrow ditch. Galvanized pipe is placed, and the cable is pulled through the conduit. Bores are generally made from road or street right-of-way line to right-of-way line.

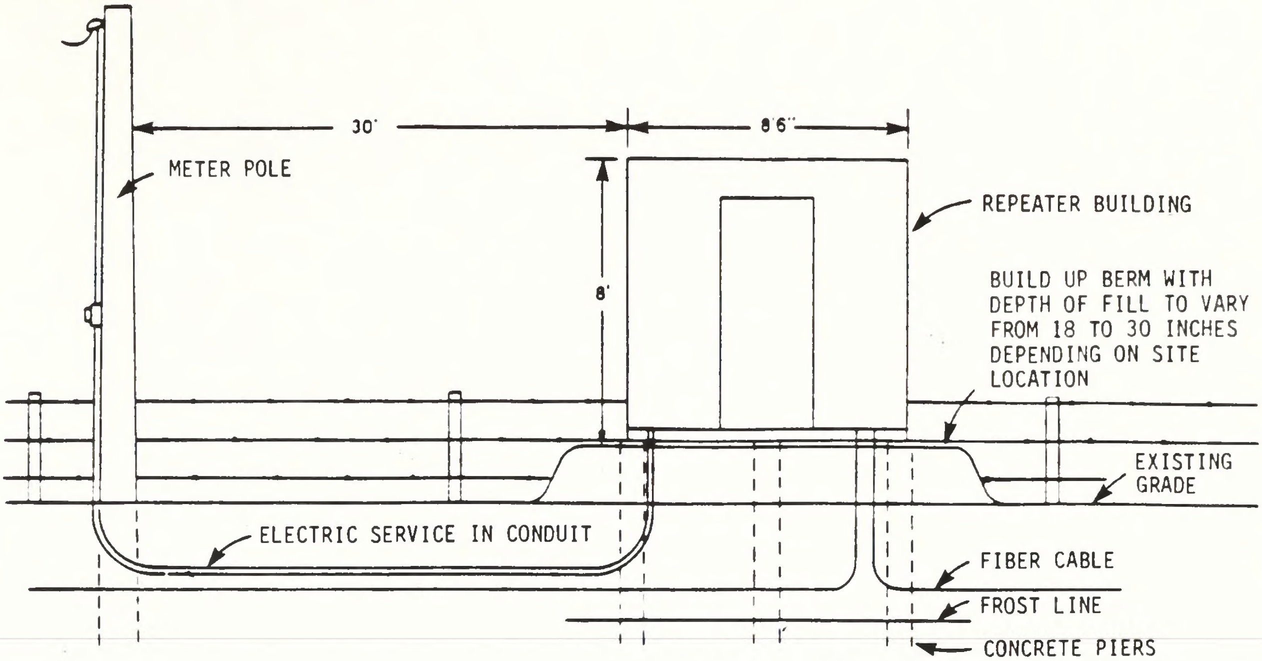
The above ground pre-cast repeater and generator huts will be erected on cast-in-place foundations. Minor excavation will be required for each station, disturbing an area approximately 25 feet by 25 feet.

Construction will involve a number of construction crews working simultaneously at different points along the route. The number and location of crews is the decision of the contractor, in conjunction with US Sprint. Crew location information will be provided to BLM, as required, prior to construction activities in any area.

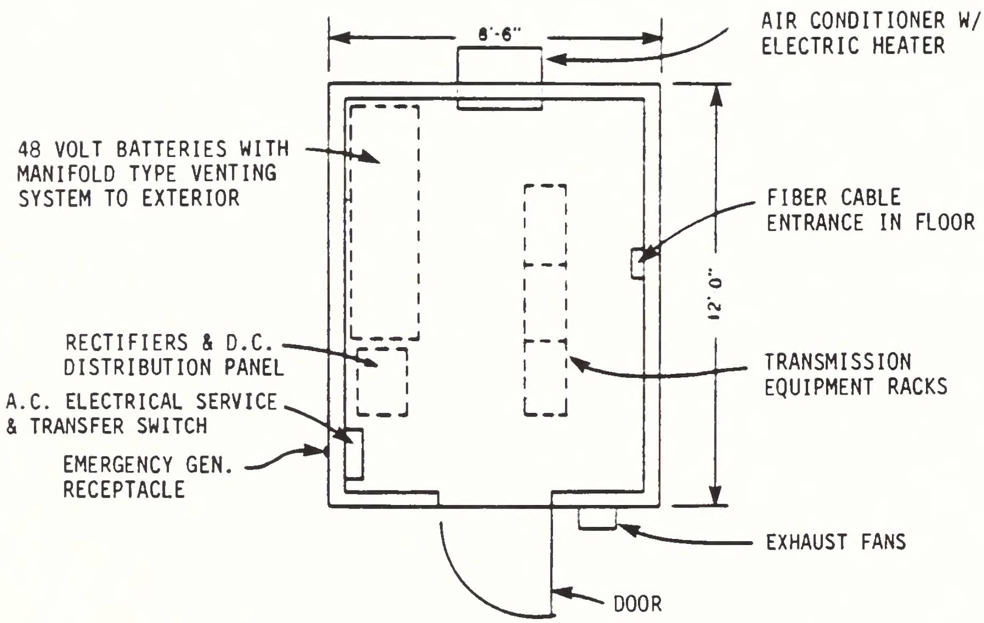


US SPRINT RIALTO–LAS VEGAS PROJECT
TYPICAL REPEATER STATION SITE PLAN

FIGURE 2



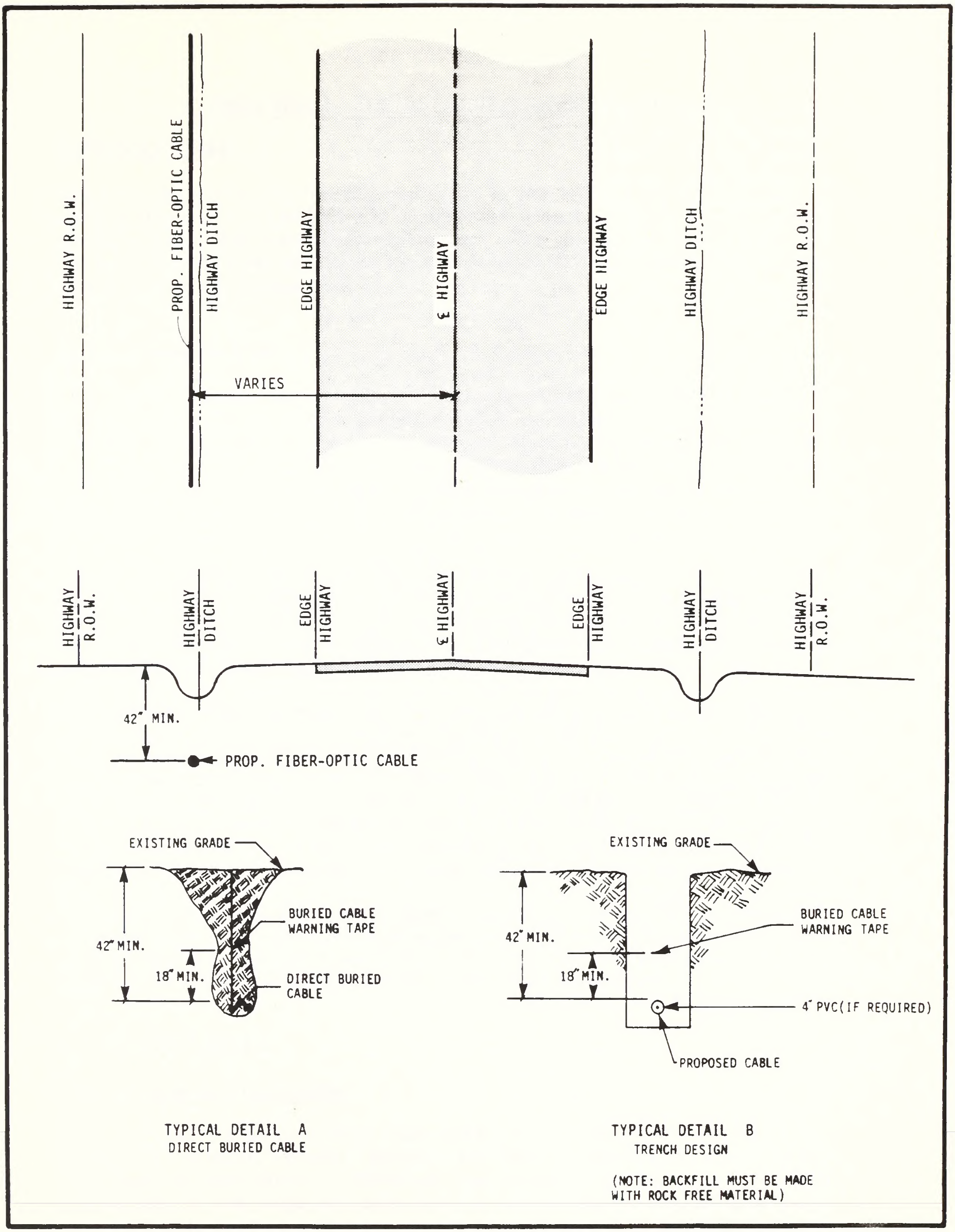
TYPICAL SITE PROFILE



TYPICAL FLOOR PLAN

US SPRINT RIALTO–LAS VEGAS PROJECT
TYPICAL REPEATER BUILDING

FIGURE 3



US SPRINT RIALTO-LAS VEGAS PROJECT

TYPICAL CABLE PLACEMENT IN HIGHWAY ROW

FIGURE 4

CHAPTER 3 - THE AFFECTED ENVIRONMENT

INTRODUCTION

The inventory of environmental resources in the project area was conducted through the use of published and unpublished literature, agency contacts and consultations, and field reconnaissance. The proposed cable route and repeater station sites are shown on the reduced 1:100,000-scale maps at the end of this report in Appendix C.

ROUTE DESCRIPTION

The proposed cable route begins in Rialto, California and traverses up Cajon Canyon. The cable will be pulled through an existing conduit system on National Forest Service Lands, so no new disturbance would occur in this segment (conduit system is shown as a dashed line on the route maps at the end of this document). The route continues along existing dirt and paved roads through the Baldy Mesa and Helendale areas. The Mojave River is crossed at Helendale.

The route continues from Helendale to Hinkley Valley and, north of Barstow, turns eastward to Yermo. From there, the route extends to the Cronese Mountains, adjacent to the old highway and the Union Pacific Railroad. In the Cronese Valley, the route is adjacent to a gravel service road and continues through the Soda Mountains to Baker.

East of Baker, the route follows an existing power line right-of-way generally paralleling Interstate 15. It crosses Halloran Wash into Shadow Valley, and runs south of Valley Wells. From Shadow Valley, the route crosses the Clark Mountains at Mountain Pass. The route crosses approximately 10 miles of the East Mojave National Scenic Area. A conduit system will be installed for several miles through the Mountain Pass area, at the request of the BLM (see Land Use section in Chapter 4). This will allow future telecommunication facilities to be placed through this area without further surface disturbance.

From Mountain Pass, the route crosses into Ivanpah Valley and crosses the dry Ivanpah Lake. It crosses the California-Nevada border and goes north near Roach Lake and south of Jean, Nevada. From there, the route continues along Interstate 15 and Highway 604 to the outskirts of Las Vegas.

EARTH RESOURCES

Physiography and Topography

The proposed US Sprint buried fiber optic cable route is located within the Transverse Ranges, Mojave Desert, and Basin and Range physiographic provinces of southeastern California and southern Nevada (Stewart 1980). Topography of the proposed cable route is typified by broad alluviated basins between relatively isolated mountain ranges and dissected uplands. The elevation of the basins generally ranges from about 1,500 to 2,000 feet above mean sea level (MSL). The mountain elevations range from less than 1,000 to over 4,000 feet above the adjacent basins.

The proposed cable route begins in Rialto near the eastern border of the Transverse Ranges Physiographic Province, one of the most tectonically and seismically active provinces in southern California. About 10 miles of the proposed route occur within this province, which is typified by east-west trending mountain ranges and geologic structure.

North of the San Andreas Fault, the majority of the proposed cable route traverses the Mojave Desert Physiographic Province, an area characterized by north- to northwest-trending topography and geologic structure. The Mojave Desert is a wedge-shaped region located southeast of the Sierra Nevada and southwest of the Basin and Range Physiographic Province. The region is bounded by the Garlock Fault on the north and northwest, by the San Andreas Fault on the southwest, and the San Bernardino Mountains on the south. The Mojave Desert has no definite eastern boundary, although this boundary is arbitrarily regarded to be the Nevada border and the lower Colorado River.

The portion of the cable route north of the Nevada-California border is located in the Basin and Range Physiographic Province. This province is characterized by interior drainage and elongate, approximately north-south trending mountains and valleys. The route traverses a variety of geomorphic landforms including alluvial fans, mountains, and playas. These landforms reflect the diverse nature of the underlying sediments and rocks that occur along the cable route.

Geology and Soils

Stratigraphy

Discussion of the stratigraphy underlying the proposed cable route is presented from oldest to youngest, beginning with a description of the consolidated rocks and followed by descriptions of the relatively young unconsolidated to semi-consolidated sediments which underlie most of the route.

Consolidated Rocks

Consolidated rocks that underlie portions of the cable route in California range in age from Precambrian to late Tertiary. Precambrian rocks are primarily metamorphic in origin and are exposed in several areas along the cable route. These rocks include gneiss, schist, quartzite, and marble.

Relatively few rocks deposited in the Paleozoic have been mapped along the cable route. These rocks occur in the east-central Mojave Desert and consist of slightly metamorphosed sedimentary rocks which are thought to be several thousand feet thick (Dibblee 1980a). These strata thin and become progressively more deformed, metamorphosed, and intruded by plutonic rocks toward the western part of the proposed route.

Rocks deposited in the Mesozoic include marine and nonmarine metasedimentary rocks, metavolcanic rocks, and abundant granitic igneous rocks (Dibblee 1980a). A major portion of the Mojave Desert is underlain by granitic intrusives similar in age and composition to the widespread granitic plutons present in the Sierra Nevada. Mesozoic sedimentary and metamorphic rocks are much less common in the study area.

Cenozoic strata are abundant in the Mojave Desert and consist of volcanic and nonmarine sedimentary rocks (Norris and Webb 1976). The sequence of volcanic and sedimentary deposits found in the early to middle Tertiary are up to 10,000 feet thick in the area surrounding the proposed cable route (Dibblee 1980b). These strata consist primarily of intercalated volcanic, pyroclastic, and clastic sedimentary rocks which accumulated in the irregular, eroded surface of the pre-Cenozoic rocks. Middle Tertiary strata include clastic sediments and lacustrine clays (Dibblee 1980b). Late Tertiary rocks are relatively uncommon in the study area, except for Pliocene-age sediments exposed near Baker, California (Dibblee 1980b).

Consolidated rocks that underlie portions of the proposed cable route in Nevada consist of rare exposures of middle to late Tertiary intrusive rocks, flows, and breccias (Stewart and Carlson 1978).

Quaternary Sediments and Volcanic Rocks

Most of the proposed cable route in California is underlain by semiconsolidated to unconsolidated Quaternary-age sediments. Quaternary alluvium has been mapped as older alluvium, alluvium, and young alluvium (Dibblee 1967). Other Quaternary units include dune sand and lacustrine (playa) deposits present beneath the dry lake beds. Older alluvium is generally associated with dissected alluvial fans or pediments, while young alluvium has been mapped in the major washes or drainages including the channel of the Mojave River. Quaternary volcanic sediments and flows are present along the cable route southeast of Baker, California.

Nearly the entire proposed cable route in Nevada is underlain by Quaternary alluvial deposits, which may locally include beach or sand dune deposits (Stewart and Carlson 1978).

Soils

Detailed soil surveys by the U.S. Department of Agriculture (USDA) have not been completed for most of the proposed cable route, which is long and often in remote areas. Data are available covering the extreme western and eastern portions of the study area (USDA unpublished data; HDR 1981). These data were compared to landforms and mapped geologic units within the remainder of the study area to provide generalized descriptions of the soils inferred to be present along the cable route.

Topographic features within the study area include mountain ranges, alluvial fans and terraces, and alluvial plains and playas. The steep slopes of the mountainous regions experience rapid to very rapid runoff and commonly high rates of erosion. Consequently, soil development is generally stunted because of rapid erosion as well as indurated parent material (bedrock). Moderate to slightly sloping alluvial fans and terraces experience medium to slow runoff, are characterized by moderate to slow erosion rates, and may have well developed deep soils. Alluvial plains and playas experience very slow to no runoff, and generally no natural erosion. Soils are typically poorly developed with salt accumulation. In many places wind has removed the fine soil particles from old alluvium, creating a surface of "desert pavement." The resulting surface is resistant to water and wind erosion.

The proposed cable route contains soils belonging predominantly to the Aridisol and Entisol USDA taxonomic soil orders. Aridisols are characterized by a low content of organic matter in the A horizon, salt or silica accumulations at depth, and low soil moisture. The two suborders of Aridisols, Argids and Orthids, are based on the presence or absence of an argillic (clay-rich) B horizon (Birkeland 1974). Argids are Aridisols with argillic B horizons. Along the proposed cable route, argids have developed on Quaternary alluvium and older alluvium.

Entisols are young soils that are characteristically lacking developed subsurface horizons. The two suborders of Entisols are Orthents (loamy or clayey) and Psamments (textures of loamy fine sand or coarser). In the study area, Entisols are typically developed on Quaternary alluvium and young alluvium. Orthents occur on the playas, and Psamments occur on young alluvial fans, plains, and terraces.

Structure

The southernmost portion of the proposed cable route begins immediately south of the San Jacinto and San Andreas faults, two closely associated northwest-trending features that dominate the structure of the eastern Transverse Ranges. Immediately north of the San Andreas Fault are the San Bernardino Mountains, an east-west trending structure composed of northeast dipping basement rocks. These mountains are basically a horstlike block uplifted along bounding faults.

The Mojave Desert is bounded on the northwest and southwest by the Garlock and San Andreas faults, respectively. These two major strike-slip faults bound a wedge-shaped structural block commonly referred to as the Mojave Block (Hewett 1956). A series of northwest trending faults, including the Lenwood, Lockhart, Harper, Helendale, Camprock, Calico, and Pisgah faults, occur across the western and central portions of the Mojave Block. These faults trend roughly parallel to the San Andreas Fault and typically bound ranges and valleys, but locally trend across valleys. Deformation along these faults began in the late Tertiary and continued into the Holocene (Dibblee 1980c). Vertical displacements on some of these faults show alternating senses of apparent vertical separation along the fault, suggesting that movement has been predominantly lateral (Dibblee 1961).

Several east-west trending faults have been recognized along the proposed cable route east and northeast of Barstow. The most prominent of these, the Manix Fault, displays evidence of left slip analogous to the Garlock Fault to the north. This fault extends from the Calico Fault eastward, about 25 miles to the mouth of Afton Canyon.

The portion of the proposed cable route east of Baker contains little evidence of deformation in the Quaternary. However, there is abundant evidence of Quaternary volcanic activity in the form of volcanic craters and cinder cones to the southeast of Baker, California.

Seismotectonic Setting

The major faults in the project region are the San Andreas, San Jacinto, and Garlock faults. The San Andreas Fault extends from the Gulf of California northwestward to Cape Mendocino and forms the principal boundary between the Pacific and North American tectonic plates. The San Jacinto Fault splays off from the San Andreas Fault near Cajon Junction and extends southeast to the Gulf of California. The Garlock Fault extends eastward from its intersection with the San Andreas Fault. These faults display abundant evidence of lateral offset in Holocene time, and the San Andreas and San Jacinto faults have had historic surface displacement. These faults are capable of generating major to great earthquakes with magnitudes of greater than 7, which could result in signficant levels of strong ground motion along the proposed cable route.

In addition to these two major active structures, several northwest trending faults considered to be active or potentially active are present in the central and western portion of the project area. Most, if not all, of the faults are capable of generating moderate to large (M=6-7) albeit less frequent earthquakes which, due to their proximity to the cable route, could result in significant ground motions and pose a potential surface fault rupture hazard.

Significant Faults

San Andreas Fault - The San Andreas Fault is the largest, most active fault in California. It is a right-lateral fault that can be divided into several discrete segments along its length based on differing seismic history and characteristics. Two of these segments, the south and south-central fault segments, influence the seismic exposure of southern California. Historically, the San Andreas Fault has produced earthquakes in excess of Richter magnitude 8; the latest event in southern California occurred in 1857 on the south-central segment of the fault. Work by Sieh (1984) provides evidence of large earthquakes occurring approximately every 145 to 200 years on the average on the south-central segment of the San Andreas Fault. The proposed cable line route crosses the San Andreas Fault near the intersection of the south and south-central segments at Cajon Junction.

San Jacinto Fault - The San Jacinto Fault is a right-lateral strike-slip fault that splays off from the San Andreas Fault south of Cajon Junction. The San Jacinto Fault appears to have taken up a signficiant percentage of the geologically recent slip that is characteristic of the south-central segment of the San Andreas Fault north of San Bernardino. This fault has been associated with numerous historic earthquakes on its entire length of approximately 140 miles. Several historical events of magnitude 6 or greater have occurred near, and been associated with, movement on the San Jacinto Fault (Rockwell and Sylvester 1979). The largest recorded event on this fault was about magnitude 7 in 1899. The proposed cable line route crosses the San Jacinto Fault about 3 miles north of Rialto, California.

Northwest-Trending Faults - A number of northwest-trending faults with Quaternary offset have been mapped within the Mojave Desert. Along Interstate 15, the proposed cable route crosses the Helendale Fault about 20 miles southwest of Barstow; the Lockhart Fault about 5 miles southwest of Barstow; the Harper Fault about 2 miles northeast of Barstow; the Calico Fault about 14 miles northeast of Barstow; and the State Line Fault adjacent to the California-Nevada state border. These faults are considered to be at least potentially active based on the ages of offset rock units (Jennings 1975). The most recent movement on these faults is considered to have occurred during the late Pleistocene or Holocene by California Division of Mines and Geology (CDMG) (personal communication, Michael Manson, CDMG, 1987). Most, if not all, of these faults may be capable of generating moderate to large magnitude earthquakes within the immediate project area.

Manix Fault - The Manix Fault is an east-west trending fault located about 25 miles east of Barstow, California. The proposed cable route is located about 2 miles north of this fault. The east-west trend of the Manix Fault generally parallels that of the Garlock Fault to the north. The Manix Fault has been historically active and was the source of the 1947 Magnitude 6.2 Manix earthquake, which caused about two inches of left-lateral displacement. South of Afton, the Manix Fault offsets Quaternary playa deposits about 10 feet in a vertical sense (Heaton 1977). This suggests that previous events may have contained an oblique or normal component of displacement.

Historical Seismicity

The central and western portions of the project study area have experienced the effects of moderate to large earthquakes within historical times (post-1850). Earthquakes of Magnitude +8 in 1857 on the San Andreas Fault, and a succession of moderate earthquakes (6 M 7) since 1890 along the San Jacinto

Fault undoubtedly resulted in strong ground motion along the proposed cable route. Potentially active faults within the Mojave Desert are probably not capable of generating earthquakes of this size. However, moderate to large (Magnitude 7) events could potentially occur along faults within the block. The two most significant historical earthquakes that have occurred within the Mojave Desert area are the 1947 Manix Earthquake (M 6.2) and the 1975 Galway Lake Earthquake (M 5.2).

HYDROLOGY

Surface Water

Major drainages in the San Bernardino Mountains, at the western end of the proposed cable route, include Cajon and Lytle creeks. These creeks typically have surface flow throughout most of the year. North of the San Bernardino Mountains, the proposed cable route is characterized by internal drainage into either the Mojave River or Kingston Wash, or into one of many dry lakes (playas) present in the region. Kingston Wash is located in the east-central portion of the study area and drains northward into the Amargosa River. The Mojave River originates in the San Bernardino Mountains and generally flows northward through Victorville and then eastward through Barstow. The Mojave River eventually terminates at Soda Lake (a playa) in the central portion of the study area. Most of the Mojave River is characterized by subsurface flow; surface flow generally occurs only in areas where the channel is restricted, such as at Lower Narrows near Victorville, in Afton Canyon, and at Camp Cady.

Due to the arid climate, all of the drainages within the Mojave Desert are ephemeral except for portions of the Mojave River as discussed above. Streamflow occurs only in direct response to rainfall, although generally only a small fraction of the total precipitation results in surface runoff due to evapotranspiration and infiltration. According to Maxey (1968), recharge in typical arid basins occurs primarily as a result of infiltration of surface runoff from precipitation over the adjacent upland area. Occasionally, intense storms generate enough precipitation to result in surface flow that reaches the local base level, which typically is a dry lake bed in the project area. Storms inundating the playa surfaces occur only infrequently, perhaps several times per century.

Ground Water

South of the San Bernardino Mountains, ground water occurs in the thick Pliocene and Pleistocene alluvial fan deposits and younger Holocene age alluvium and channel deposits that overlie the pre-Tertiary crystalline and metamorphic basement complex of the area. Thickness of the older alluvial fan deposits may exceed 2,000 feet locally, while the younger alluvium ranges in thickness from 0 to 130 feet. (Dutcher and Burnham 1960). Depth to ground water is typically 100 to 300 feet below ground surface along the route south of the San Bernardino Mountains (CDWR 1959).

North of the San Bernardino Mountains, the area surrounding the proposed cable route is generally characterized by large ground water basins that are commonly interconnected, resulting in interbasinal flow of ground water. Typically, ground water in these hydrologic basins is present in coarser alluvial deposits as well as fanglomerates beneath the flanks of the basin. Consolidated rock units generally do not contain significant amounts of ground water unless highly fractured. Fine-grained deposits commonly present in the central portions of desert basins also generally yield only small amounts of water to wells. Depth to ground water across the Mojave Desert is highly variable (generally 0 to 300 feet below ground surface). In general, shallow ground water is present in the topographically lowest portion of the hydrologic basins (which, along the proposed cable route, is typically a playa) and near the Mojave River. Shallow ground water beneath playa lakes is commonly of poor quality because salt buildup results in high levels of total dissolved solids. Shallow ground water also is common beneath the distal portions of alluvial fan complexes (Maxey 1968).

BIOLOGICAL RESOURCES

The biological resources along the proposed fiber optic cable route are described below. All but several miles of the proposed route is located within 40 feet of the edge of an existing paved or dirt road. The impacts of the proposed project on biological resources are expected to be limited because most of roadside habitats are of low value, and because the impacts will primarily be temporary. Therefore, the biological investigations focused primarily on the occurrence of sensitive biological resources (plants, wildlife, and habitats) within or adjacent to the proposed corridor.

Information presented below was developed from a review of applicable literature and reconnaissance field surveys in June 1987. Regional floras and natural history guides were consulted for background data, as well as in-house information and the biological assessments for the following projects in the region: Upper Santa Ana River Project, McCullough-Victorville Transmission Line, Pac-Tex Pipeline Project, and IPP Transmission Line Project. Reconnaissance field surveys were conducted along the entire length of the originally proposed route on 29 May and 5, 10, 14, 15, 16 June 1987. During these surveys, biologists familiar with the regional biota drove along the roads adjacent to the corridor using US Sprint engineering maps and stakes in the field for orientation. Major roadside vegetation/habitat types were noted and mapped. Periodic stops were made to either examine sensitive features or portions of the corridor which appeared characteristic of the local area. During most of the surveys, a botanist and wildlife biologist were both present.

Subsequent to the above investigations, several deviations from the original route were suggested by the BLM. Therefore, the new alignments have not been surveyed in the field. However, as described in the following sections, sensitive species and habitats are not likely to be adversely affected along the new alignment since the corridor would occur in previously disturbed roads and rights-of-ways.

Overview of Sensitive Species and Habitats

With few exceptions, the proposed route occurs within roadside areas of low habitat value. However, the route could potentially traverse localized areas that (1) provide marginal or ephemeral habitat for certain sensitive wildlife species in the region and/or (2) support rare plant species that are either tolerant of roadside disturbances or dependent upon them.

The following sections briefly describe sensitive biological resources that occur within the broad region traversed by the proposed route. These resources consist of either sensitive species (plants or animals) or sensitive habitats (e.g., wetlands). Both the "sensitivity" of these resources and the likelihood of their occurrence within or adjacent to the proposed route varies greatly.

Botanical Resources

Legally Protected and Other Sensitive Species

Legally protected species consist of plants listed as rare, threatened, or endangered by the California state government (California Department of Fish and Game (CDFG) 1987), critically endangered by the Nevada state government (Nevada Division of Forestry (NDF) 1987), or threatened and endangered by the federal government (U.S. Fish and Wildlife Service (USFWS) 1986a). Other sensitive plants include species whose rarity and vulnerability may make them suitable for future listing. These species include the following categories:

- candidates (Categories 1 and 2) for federal listing (USFWS 1985a)
- plants on the California BLM Sensitive Plant List
- plants on List 1B (rare and endangered) of the California Native Plant Society (CNPS) (Smith and York 1984)
- plants listed as "sensitive species" by the Northern Nevada Native Plant Society (NNNPS 1987).

A list of legally protected and other sensitive plant species that could potentially occur along the proposed route was developed by a review of regional floras (Munz 1974; Beatley 1976; Thorne et al. 1981; DeDecker 1984; NNNPS 1987), previous environmental investigations along the I-15 corridor and in San Bernardino County (BLM 1979, 1980; Schultz 1982, 1984; Dames &

Moore 1985), data from the California Natural Diversity Data Base (CNDDB), and in-house data.

A total of 12 plant species could potentially occur along some portion of the proposed route as described in Table 3-1. The likelihood of their occurrence ranges from very slight possibility to known occurrence. One state- and federal-listed endangered plant species, the Santa Ana River woolly-star, occurs along the route. Another state- and federal-listed plant, slender-horned spineflower, occurs in the region of the proposed route.

Most of the species listed in Table 3-1 are not expected to occur within the proposed corridor due to unsuitable habitat conditions and previous disturbance. Roadside habitats in the region do not represent a common or favorable location for viable populations of any species listed in Table 3-1. An analysis of the known or potential occurrence of these species along the route is provided following this overview.

Species of Special Interest

Species of special interest are other plant species of limited distribution that are of interest to resource agencies and conservation groups. These species do not have the same rarity and vulnerability as those discussed above. Species of special interest include the following categories:

- plants on CNPS List 2 (rare in California, but common elsewhere) or List 4 (plants of limited distribution - a watch list)
- plants designated "other rare species" on the NNNPS list

Seven plant species of special interest could potentially occur along the proposed route as described in Table 3-2. The likelihood of their occurrences varies greatly.

Sensitive Vegetation Types

Sensitive vegetation types represent resources of limited distribution that are protected by state or federal policies because they are rare, provide unusual ecological functions, support sensitive species, and/or provide habitat for an abundant and varied fauna. Sensitive vegetation types which could potentially be crossed by the proposed route include alluvial fan scrub, riparian woodland, desert wash, and wetland vegetation at perennial and seasonal watercourses or basins. One Unusual Plant Assemblage (UPA) identified by the BLM (1980), Valley Wells shadscale scrub assemblage, occurs in the vicinity of the route near Valley Wells Station.

TABLE 3-1
SENSITIVE PLANT SPECIES IN THE PROJECT AREA

Scientific Name[1]	Common Name	Growth Form[2]	Flowering Period	State/USFWS/BLM Status[3]	CNPS/ NNPS/List[4]	Likelihood of Occurrence in or Near the Corridor[5]	Distribution Notes[6]
Arctomecon californica	Golden bear poppy	PH	April-May	NCE/C2	RFT	Slight possibility	NV; AZ southern Nevada, Las Vegas and vicinity; CBS; 1310-2760 ft.
Astragalus cimae var. cimae	Cima milkvetch	PH	April-May	--	1B/OR	Very slight possibility	CA; NV; eastern Mojave Desert; New York Mtns., Mid Hills; rare in calcareous soils. Veg: SS, JTW; 4700-6000 ft.
Astragalus jaegerianus	Lane Mtn. milkvetch	PH	April-June	C2/BLM	1B	Slight possibility	CA; 30 mi. NE of Yermo on granite hillsides; approximately 10 sq. mi. on Coolgardie Mesa between Barstow and Goldstone. Veg: CBS, JTW; 300-3000 ft.
Centrostegia leptoceras	Slender-horned spineflower	AH	April-June	CE/FE	1B	Slight possibility	CA; San Bernardino Valley and Elsinore to San Fernando Valley Cajon Pass; many historical sites extirpated; open sandy areas. Veg CSS, CH; below 3000 ft.
Coryphantha vivipara var. alversonii	Foxtail cactus	S	May-June	C2/BLM	1B	Slight possibility	CA; Clark Mtns., Little San Bernardino Mtns., to Eagle and Chuckwalla Mtns.; stony slopes. Veg: CBS, JTW; 2000-5000 ft.

Table 3-1 (continued)
Sensitive Plant Species in the Project Area

Scientific Name[1]	Common Name	Growth Form[2]	Flowering Period	State/USFWS/BLM Status[3]	CNPS/ NNPS/List[4]	Likelihood of Occurrence in or Near the Corridor[5]	Distribution Notes[6]
Cymopterus deserticola	Desert cymopterus	PH	March-May	C2/BLM	IB	Possible	CA; western Mojave Desert; Kramer Junction, Victorville, Apple Valley, and Edwards AFB; very rare in flats of old dunes with deep, fine to coarse, well-drained, sandy soils. Veg: CBS, JTW; 2300-4300 ft.
Eriastrum densifolium ssp. sanctorum	Santa Ana River woolly-star	PH	June-August	CE/FE	IB	Known occurrence	CA; San Bernardino Valley; San Bernardino, Riverside and Orange counties (extirpated from Orange Co.); Santa Ana River tributary floodplains. Observed along south side of Baseline Avenue west of Lytle Cr., and on west side of Cajon Blvd. north of Institutions Rd. Veg: CSS, RAF 1500 ft.
Erigeron parishii	Parish's fleabane	PH	May-June	C2	IB	Very unlikely	CA; southern Mojave Desert; north base of San Bernardino Mountains; Cushenbury Canyon; Joshua Tree Woodland dry slopes; limestone derived soils; 2600-6400 feet. In route vicinity, occurs in T16N R13E Sections 20 and 21; possibly in Sections 16 and 17 as well.

Table 3-1 (continued)
Sensitive Plant Species in the Project Area

Scientific Name[1]	Common Name	Growth Form[2]	Flowering Period	State/USFWS/BLM Status[3]	CNPS/ NNPS/List[4]	Likelihood of Occurrence in or Near the Corridor[5]	Distribution Notes[6]
Eriophyllum mohavense	Mojave woolly sunflower	AH	April-May	C2/BLM	IB	Slight possibility	CA; western Mojave Desert; Barstow, Kramer Junction; very rare in sandy or rocky flat or sloping places. Veg: CBS; 2000-3000 ft.
Mimulus mohavensis	Mojave monkey flower	AH	April-June	--	IB (new listing)	Possible(?)	CA; Mojave Desert; San Bernardino County; Barstow, Victorville-Ord Mountains region; uncommon to rare in sandy and gravelly places. Veg: CBS, JTW; 2000-3000 ft.
Opuntia basilaris var. brachyclada	Short-jointed beavertail cactus	S	May-June	C2/BLM	IB	Slight possibility	CA; Mojave Desert; north slopes of San Bernardino Mountains, Providence Mountains; Cajon Pass and Lone Pine Canyon; on dry slopes. Veg: CH, JTW; 400-7500 ft.
Penstemon bicolor ssp. bicolor and ssp. roseus	Bicolored penstemon	PH	May-June	C2/BLM	W	Known occurrence	NV; McCullough Mountains, SE slope of Spring Mountains, Kyle Canyon south to Jean; in washes and on roadsides. Observed along roadside of Hwy 604 in the vicinity of Jean, NV, north for about 4 miles. Veg: CBS; 2000-3000 ft.

Table 3-1 (continued)
Sensitive Plant Species in the Project Area

Scientific Name[1]	Common Name	Growth Form[2]	Flowering Period	State/USFWS/BLM Status[3]	CNPS/ NNPS/List[4]	Likelihood of Occurrence in or Near the Corridor[5]	Distribution Notes[6]
Pholisma arenarium	Pholisma	PH	April-July (Oct)	C2/BLM	--	Possible	CA; Baja; Mojave and Colorado deserts, coast from San Luis Obispo Co. to northern Baja California; parasitic on roots of Eriodictyon, Haplopappus, Chrysothamnus, Ambrosia and Hymenoclea in sandy places. Veg: CS, CBS, JTW; 5000 ft.
Sphaeralcea rusbyi ssp. eremicola	Rusby's desert mallow	AH	May-June	C2/BLM	IB	Slight possibility	CA; Panamint Mtns. (Inyo Co.), Clark Mtns. (Keany Pass); rare, only one known population in Clark Mtns. Veg: CBS, BS; 3000-4500 ft.

1 Scientific nomenclature and common names follow Smith and York (1984), USFWS (1985).

2 Growth Form: AH = annual herb; PH = perennial herb; AG = annual grass; PG = perennial grass; S = shrub.

3 Legal Status: FE = Federal listed endangered; CE = California listed endangered; C2 = Federal Category 2 candidate (threat and/or distribution data are insufficient to support federal listing); BLM = Bureau of Land Management sensitive species; NCE = Nevada state listed critically endangered (NDF 1987).

4 CNPS List = California Native Plant Society Lists (Smith and York 1984), IA = plants presumed extinct in California; IB = plants rare and endangered in California and elsewhere; 4 = plants of limited distribution (a watch list); NNPS List = Northern Nevada Native Plant Society (1987); W = watch list; OR = other rare species; RFT = recommended for federal threatened.

5 The proposed corridor will be 20 feet wide and be located primarily adjacent to existing roadways.

6 Occurrence and distribution data are based on information from DeDecker (1984), Munz and Keck (1968), Munz (1974), Smith and York (1984), distributional data from the California Natural Diversity Data Base (CNDDB) dated February 27, 1987 and Nevada Natural Heritage Program (1987), and field surveys. Vegetation types: CBS = creosote bush scrub; JTW = Joshua tree woodland; CH = chaparral; CSS = coastal sage scrub; CS = coastal strand; SS = saltbush scrub; PJW = pinyon-juniper woodland; BS = blackbush scrub; RS = riparian scrub; RAF = Riversidian alluvial fan sage scrub.

TABLE 3-2
OTHER PLANT SPECIES OF SPECIFIC INTEREST IN THE PROJECT AREA

Scientific Name[1]	Common Name	Growth Form[2]	Flowering Period	CNPS/ NNPS/List[3]	Likelihood of Occurrence in or Near the Corridor[4]	Distribution Notes[5]
Agave utahensis var. nevadensis	Clark Mtn. agave	PH	May-July	4	Very slight possibility	CA, NV; eastern Mojave Desert, Kingston, Clark and Ivanpah mtns., eastern San Bernardino Co., Potosi and Charleston mtns.; on open rocky limestone soils in gravels, rock crevices and ledges. Veg: SS, JTW; 3000-5000 ft.
Androstephium brevifolium	Small-flowered androstephium	PH	?	2	Slight possibility	CA, NV, AZ; eastern Mojave Desert, Black Mtns., Greenwater Valley; rare on dry slopes and plains. Veg: CBS; below 5000 ft.
Chorizanthe spinosa	Mojave spine-flower	AH	April-July	4	Possible	CA; western Mojave Desert; Edwards AFB, Kramer Junction, Adelanto; scattered on alluvial fans, sandy washes and flats. Veg: CBS, JTW; 2500-3500 ft.
Eriogonum heermanii var. floccosum	Clark Mtn. buckwheat	PH	?	4	Slight possibility	CA; eastern Mojave Desert, Little San Bernardino Mtns. to Providence, New York, and Clark Mtns., on dry slopes and ridges. Veg: PJW.
Linanthus arenicola	Sand linanthus	AH	March-April	2	Possible to probable	CA, NV; Mojave Desert, Barstow, Kelso, Daggett, Searles Lake, Trona, Needles, Nipton; rare gypsophilous plant. Veg: JTW; 2500-4000 ft.
Phacelia anelsonii	Nelson's phacelia	AH	April-May	2/OR	Possible	CA, NV, UT; eastern Mojave and Basin and Range deserts, McCullough Mtns., Clark Mtns.; rare in dry places on disturbed and rocky soils, washes, slope bases and talus. Veg: CBS, BS, JTW, PJW; 2000-6000 ft.

Table 3-2 (continued)
Other Plant Species of Specific Interest in the Project Area

Scientific Name[1]	Common Name	Growth Form[2]	Flowering Period	CNPS/ NNPS/List[3]	Likelihood of Occurrence in or Near the Corridor[4]	Distribution Notes[5]
Psorothamnus arborescens var. arborescens	Mojave indigo bush	S	April-May	4	Known occurrence	CA; Mojave Desert, Canyon Pass to Barstow and Randsburg; on stony flats and outwash fans. Veg: CBS, JTW; 1300-2600 ft.
Stipa arida	Mormon needle grass	PG	May-June	2	Very slight possibility	CA, NV, AZ; eastern Mojave Desert to Colorado, Texas, Funeral and Clark mtns.; dry slopes, probably limestone. Veg: PJW; 4000-5700 ft.

1 Scientific nomenclature and common names follow Munz (1974) and Smith and York (1984).
2 Growth Form: PH = perennial herb; AH = annual herb; S = shrub; PG = perennial grass.
3 CNPS (California Native Plant Society) List: 2 = plants rare or endangered in California, but more common elsewhere; 4 = plants of limited distribution (a watch list); NNNPS (Northern Nevada Native Plant Society 1987) List: OR = other rare species.
4 The corridor will be 20 feet wide and will be primarily located adjacent to existing roadways.
5 Occurrence and distribution data are based on information from Munz and Keck (1968), Munz (1974), Smith and York (1984), distributional data from the California Natural Diversity Data Base (CNDDB) dated February 27, 1987, Nevada Natural Heritage Program (1987), and field surveys. Vegetation types: SS = saltbush scrub; JTW = Joshua tree woodland; CBS = creosote bush scrub; PJW = pinyon-juniper woodland; BS = blackbush scrub.

Wildlife Resources

Legally Protected Species

These wildlife species consist of amphibians, reptiles, birds, or mammals that are listed as rare, threatened, or endangered by the California state government (CDFG 1986), Nevada state government (Nevada Division of Wildlife (NDW) 1987), or federal government (USFWS 1986a). Three legally protected species which could potentially occur within or near the proposed corridor are described below. Legally protected species which are known to occur in the Mojave Desert region and in the San Bernardino Mountain area, but which would not utilize roadside habitats, are not described here.

Gila Monster

The gila monster (Heloderma suspectrum) is designated a rare species by the Nevada state government (NDW 1984). It is also a candidate for federal listing (USFWS 1985b) and a California BLM sensitive species. The gila monster has been reported in the Clark Mountains, but surveys to find this species were unsuccessful (McGurty 1977). It is more common in Nevada, but there are no published reports of the species along the cable route. Suitable habitat consists of washes and bajadas. Gila monsters are expected to be very rare or absent along the proposed route.

Desert Tortoise

The desert tortoise (Gopherus agassizii) is designated a rare species by the Nevada state government (NDW 1984), is a BLM sensitive species, and is a candidate for federal listing (USFWS 1985b). It occurs in low-lying areas of the Mojave Desert in California, Nevada, Utah, and Arizona. The density of desert tortoise varies greatly depending on habitat conditions, particularly substrate and slope. Desert tortoise are common to abundant from Adelanto to Barstow in the western end of the project area in the Mojave Desert (Berry 1984; Lukenbach 1982). They are occasional to common near Baker, in Shadow Valley, and in Ivanpah Valley (California and Nevada).

Desert tortoise are common west of Interstate 15 from Jean, Nevada south to near the state line. Approximately seven miles of this area is part of the BLM Goodsprings Crucial Tortoise Habitat.

In general, desert tortoise (and in particular, their burrows) are expected to be uncommon along roadside habitats. However, their abundance will vary greatly depending on the condition of the roadside habitat and level of traffic. BLM reports that desert tortoise are common along Interstate 15 south of Jean, Nevada to the state line.

Mohave Ground Squirrel

The Mohave ground squirrel (Spermophilus mojavensis) is designated a rare species by the California state government (CDFG 1986) and is a candidate for federal listing (USFWS 1985b). This species occurs in a range of scrub habitats within a relatively restricted portion of the Mojave Desert (Wessman 1977). It is occasional to common in portions of the area traversed by the route from near Adelanto to Helendale.

Other Sensitive Species

Other sensitive species include wildlife that are of limited distribution and may be experiencing population declines, but do not have the same rarity and vulnerability as legally protected species. These include candidates for federal listing (USFWS 1985b) and BLM "sensitive species". The following other sensitive species could potentially occur within or adjacent to the proposed corridor.

Species	Potential Location
San Diego horned lizard	Cajon Canyon (washes)
Orange-throated whiptail	Cajon Canyon (washes)
Ferruginous hawk	Mojave Desert (mountains)
Desert bighorn sheep	Mojave Desert (select mountains)

Sensitive Habitats

Sensitive habitats for wildlife consist of highly restricted habitats that either support a legally protected (or otherwise sensitive) species and/or a varied and abundant fauna. Along the proposed route, these habitats would include:

- high density population areas of desert tortoise or Mohave ground squirrel
- riparian woodlands, such as along parts of the Mojave River which support a diverse spring-breeding avifauna, including yellow warbler, yellow-breasted chat, and willow flycatcher
- desert wash habitats which provide a slightly unusual habitat for various wildlife compared to other, more common desert habitats
- nesting habitat (i.e., rocky remote slopes or cliffs) for various raptors, including prairie falcon, golden eagle, and Cooper's hawk

Biological Resources Along the Proposed Route

The biological resources within and directly adjacent to the 20-foot-wide cable corridor are described below based primarily on observations made during a June 1987 reconnaissance survey. Although the cable route is long, the diversity of habitats along the route is only moderate primarily because of the relative homogeneity of scrub vegetation within the Mojave Desert region. Major changes in vegetation and habitat types occur only across the San Bernardino and Clark mountains, and at several low-lying areas within the Mojave Desert.

The route primarily occurs in undeveloped or sparsely developed areas with the exception of the urbanized areas at the beginning and end of the route, and at several small towns in the Mojave Desert. However, because the proposed corridor is located adjacent to existing roads, very little undisturbed, high quality native habitat is likely to be affected by the project. With few exceptions, the native habitat adjacent to roads along the route has either been removed or highly degraded by clearing, application of gravel, off-road traffic, and refuse dumping. In the Nevada portion, from the general vicinity of the State line to the general vicinity of Jean, Nevada, the habitat is relatively undisturbed due to the restrictive access created by the I-15 fence.

Botanical Resources

Vegetation Types

Vegetation types traversed by the proposed route are described below and summarized in Table 3-3. As noted above, most of the route consists of variously disturbed roadside habitat. As such, there is a gradient of disturbance to vegetation from the road's edge outward. Because the proposed cable will primarily be located within 30 to 40 feet of existing roadways, much of the vegetation within the 20-foot-wide corridor will have been previously disturbed and/or invaded by weeds. Hence, the vegetation types listed in Table 3-3 and noted below more accurately describe the undisturbed vegetation type adjacent to the corridor, rather than within the corridor.

To facilitate data summary and presentation, the proposed route has been divided into seven study segments with lengths ranging from about 20 to 40 miles. These segments are described below and listed in Table 3-3.

Segment 1 - Rialto to Baldy Mesa

The route begins in the urbanized area of Rialto and travels north up Cajon Canyon following various city roads, Cajon Boulevard, and Interstate 15. The proposed route will use a 12-mile-long existing conduit through the San Bernardino Mountains and over Cajon Pass on National Forest lands (no land disturbance will occur in this portion). This route segment ends near the California Aqueduct on the northern lower slopes of the San Bernardino Mountains and Baldy Mesa. The entire segment, excluding the Forest Service portion, is approximately 20.4 miles long.

The route follows existing paved roads along the segment. Vegetation types adjacent to, and sometimes within, the proposed roadside corridor of this segment are listed in Table 3-3.

Segment 2 - Baldy Mesa to Helendale

This segment extends about 23 miles from the gentle, lower alluvial slopes of Baldy Mesa (San Bernardino Mountains), through the developed areas of Adelanto and George Air Force Base to a crossing of the Mojave River at Helendale. The proposed route follows existing dirt and paved roads along the entire length of the segment. Most of the corridor in this segment is within 5 or 10 feet of the existing roadway edge; as such, the corridor mostly consists of roadway (asphalt) and shoulder (gravel). Major vegetation types adjacent to the corridor are listed in Table 3-3. Desert wash and riparian scrub/woodland occur along the Mojave River.

Segment 3 - Helendale to Yermo

This 34.5-mile-long segment traverses a wide variety of land uses, vegetation types, and topographic conditions. The route occurs along relatively flat lands from Helendale to Hinkley Valley north of Barstow. The Mojave River is crossed in Hinkley Valley. From this point, the route travels north of Barstow along Highway 58 and a dirt road eastward to the town of Yermo.

The proposed route follows dirt or paved roads throughout this segment, occuring in the roadbed to within 5 to 15 feet of the roadway edge. Vegetation and land use types traversed by the route are listed in Table 3-3. Urban and ruderal areas are found at numerous scattered locations along the segment (i.e., Hodge, Lenwood, Hutt, Hinkley Valley, and Yermo). A small area of alkali sink scrub occurs in Hinkley Valley. Desert wash vegetation is traversed at the Mojave River crossing, also in Hinkley Valley.

Segment 4 - Yermo to Cronese Mountains

This segment traverses relatively homogeneous vegetation types and topographic conditions. It is approximately 32 miles long, extending from the town of Yermo to the Cronese Mountains. For the first two-thirds of the segment, the corridor occurs adjacent to the old highway and the railroad. Near Fields, the corridor is located between Interstate 15 and the Union Pacific Railroad. The corridor rejoins Interstate 15 near Dunn, crossing the highway at the exit to Afton Canyon, and follows a gravel road north of the highway to the end of the segment. The eastern end of the segment travels between the Cronese and Cave mountains, terminating at Cronese Valley. The dominant vegetation type along the route is creosote bush scrub (Table 3-3). Very few ruderal or developed areas occur along this segment.

TABLE 3-3
SUMMARY OF VEGETATION TYPES ALONG THE PROPOSED ROUTE

Vegetation/Land Use Types		Approximate Miles[1]
Segment 1 - Rialto to Baldy Mesa		
Urban Areas		6.4
Chaparral		4.7
Joshua tree woodland		4.2
Oak-juniper scrub/woodland		2.3
Ruderal (barren soils)		2.4
Alluvial fan scrub		0.4
	Subtotal =	20.4
Segment 2 - Baldy Mesa to Helendale		
Creosote bush scrub		16.8
Mixed desert scrub		2.6
Ruderal (barren and cleared)		2.5
Desert wash		1.4
Desert riparian scrub/woodland		0.2
	Subtotal =	23.0
Segment 3 - Helendale to Yermo		
Creosote bush scrub		21.2
Saltbush scrub		5.5
Urban and ruderal		5.0
Alkali sink scrub		1.7
Agriculture		0.8
Desert wash		0.3
	Subtotal	34.5

[1]Note that these are estimates of mileage to be used for illustrative and comparative purposes only.

Table 3-3 (continued)
Summary of Vegetation Types Along the Proposed Route

Vegetation/Land Use Types		Approximate Miles[1]
Segment 4 - Yermo to Cronese Mountains		
Creosote bush scrub		31.5
Saltbush scrub		0.5
	Subtotal	32.0
Segment 5 - Cronese Mountains to Shadow Valley		
Creosote bush scrub		33.6
Joshua tree woodland		3.4
Saltbush scrub		2.8
Desert wash		1.2
	Subtotal =	41.0
Segment 6 - Shadow Valley to Ivanpah Valley		
Creosote bush scrub		17.4
Dry lake bed		2.9
Desert wash		2.8
Joshua tree woodland/blackbush scrub		2.0
Joshua tree woodland		1.5
Joshua tree woodland/mixed desert scrub		1.1
Blackbush scrub/native perennial grassland		0.9
Ruderal		0.8
Saltbush scrub		0.6
	Subtotal =	30.0
Segment 7 - Ivanpah Valley to Near Las Vegas		
Creosote bush scrub		16.2
Ruderal		0.8
	Subtotal =	17.0

Segment 5 - Cronese Mountains to Shadow Valley

This segment is approximately 41 miles in length. It begins by traversing Cronese Valley along a gravel service road, continuing through the Soda Mountains on to Baker. Just south of Baker, at the Soda Springs exit, the route crosses and then generally parallels Interstate 15. At this point the route occurs up to one mile to the south and east of the highway, between the highway and the dry lakebed of Soda Lake. Immediately east of Baker, the corridor follows an existing power line right-of-way and Interstate 15 (for a short distance). The segment then travels along Halloran Wash (either along the highway or along the power line right-of-way) and down into the broad Shadow Valley where it ends south of Valley Wells.

The dominant vegetation type traversed by this segment is creosote bush scrub (Table 3-3). However, several other types are also within or adjacent to the roadside corridor. Saltbush scrub (Valley Wells shadscale scrub assemblage) vegetation occurs in low-lying areas east of Baker and in Shadow Valley. Desert wash vegetation is traversed in Cronese Valley and at Halloran Wash. Joshua tree woodland occurs on the higher slopes between Halloran Springs and Shadow Valley.

Segment 6 - Shadow Valley to Ivanpah Valley

This 30-mile-long segment crosses the greatest range of elevation and vegetation types. It begins on the eastern side of Shadow Valley, and crosses the Clark Mountains at Mountain Pass. From this point, it descends into Ivanpah Valley where it crosses the dry bed of Ivanpah Lake. The route then crosses the state border and goes north near Roach Lake bed to a point five miles south of the town of Jean, Nevada.

For the entire segment, the proposed route is located adjacent to Interstate 15 except for a 6-mile-long segment deviating west of Ivanpah Lake, where the route follows a graded road and a power line right-of-way. A wide variety of vegetation types are within or near the roadside corridor, as shown in Table 3-3. Four major vegetation types occur in various mixtures in the Clark Mountain Range: blackbush scrub, Joshua tree woodland, native perennial grassland, and desert wash. The dry bed of Ivanpah Lake has little or no vegetation. This valley also contains scattered areas of desert wash and saltbush scrub.

Segment 7 - Ivanpah Valley to near Las Vegas

The final segment extends about 17 miles from northern Ivanpah Valley to the edge of the urbanized areas of Las Vegas where the route would terminate. Along this segment, the route follows Interstate 15, then Highway 604 to Las Vegas. It is a relatively flat and homogeneous area, dominated by creosote bush scrub.

Legally Protected and Other Sensitive Species

The known or potential occurrence of the species listed in Table 3-1 within or near the proposed corridor is summarized in Table 3-4. This evaluation was based on a review of the applicable literature and observations during field surveys. The latter were conducted in early June 1987. At that time, not all the species listed in Table 3-1 were readily visible. However, the potential occurrence of species which are more conspicuous at other times of the year could be inferred based on habitat conditions along the proposed route. This evaluation of species occurrence, based primarily on habitat conditions, was well suited to the project for the following reasons: (1) habitat conditions along roadsides in the Mojave Desert are relatively homogeneous compared to more mesic portions of the area, and (2) roadside habitats are disturbed to varying degrees such that only disturbance-tolerant and/or -dependent species are expected to occur (at least near the road).

The Santa Ana River woolly-star and the bicolored penstemon were found at six locations along the proposed route during the field surveys. The status of these species and their exact occurrence in relation to the route are described below. A number of other sensitive species could potentially occur along certain portions of the route, as summarized in Table 3-4. Based solely on general habitat requirements (slope, elevation, floristic region), the likelihood of these species occurring along the route varies greatly. None of these species was observed during the field surveys. Because the entire corridor was not examined completely on foot, it is possible that some of the species listed in Table 3-4 could occur along portions of the route. However, these potential occurrences are expected to be few in number, and consist primarily of only a few plants or small populations due to unfavorable habitat conditions in roadsides. In addition, it is expected that most sensitive plants along the route would occur primarily outside the corridor, away from the most intense area of roadside disturbance.

Santa Ana River Woolly-Star

The Santa Ana River woolly-star (Eriastrum densifolium ssp. sanctorum) is designated an endangered species by the State of California (CDFG 1987) and the federal government (USFWS 1986b, 1987). The woolly-star is a grey-green shrub with blue flowers that occurs in alluvial fan scrub of the higher floodplain terraces of the Santa Ana River and its tributaries. It is restricted to several disjunct stands and tends to occupy habitats with little evidence of surface disturbance. A population occurs along Cajon Creek on the east side of Highway 215, and extends south along Cajon Creek to near Institution Road (Bio-Tech 1985). Another population occurs in Lytle Creek (Zembal and Kramer 1984).

The occurrence of the woolly-star along the route was evaluated during a complete field survey of the corridor from Rialto to near Devore (the boundary of National Forest land). The survey was conducted on May 29 and June 10, 1987 by Tim Krantz, a local botanist who has extensive experience

TABLE 3-4
SUMMARY OF KNOWN OR POTENTIAL
SENSITIVE PLANT SPECIES OCCURRENCE

Segment No.	Sensitive Species or Species of Special Interest[1]	Occurrence In or Near the Proposed Corridor
1	Santa Ana River woolly-star (Eriastrum densifolium sanctorum)	• South of corridor along Baseline Road at Lytle Creek crossing in Rialto • Adjacent to corridor along Cajon Boulevard 2.5 miles south of Devore
	Slender-horned spineflower (Centrostegia leptoceras)	Not observed in or near corridor during surveys; single population near Devore, mile from corridor
	Short-jointed beavertail cactus (Opuntia basilaris var. brachyclada)	Possible on Baldy Mesa, but not observed during surveys
2	Mojave spineflower (Chorizanthe spinosa)	Possible along entire length, but not observed during surveys
	Desert cymopterus (Cymopterus deserticola)	Possible along entire length, but not observed during surveys
	Mojave fishhook cactus (Sclerocactus polyancistrus)	Slight possibility along northern end of segment, but not observed during surveys
3	Mojave spineflower (Chorizanthe spinosa)	Possible along portions of route south of Barstow, but not observed during surveys
	Lane Mountain milkvetch (Astragalus jaegerianus)	Slight possibility north of Barstow, but not observed during field surveys

[1]Background data and protection status for each species are provided in text.

Table 3-4 (continued)
Summary of Known or Potential Sensitive Plant Species Occurrence

Segment No.	Sensitive Species or Species of Special Interest[1]	Occurrence In or Near the Proposed Corridor
3 cont	Mojave woolly sunflower (Eriophyllum mohavensis)	Slight possibility north of Barstow, but not observed during field surveys
	Mojave monkey flower (Mimulus mohavensis)	Possible along selected portions of segment; habitat requirements not well documented; not observed
	Pholisma (Pholisma arenarium)	Possible along much of segment, but not observed during surveys
	Mojave fishhook cactus (Sclerocactus polyancistrus)	Possible along selected portions but not observed during surveys
	Mojave indigo bush (Psorothamnus arborescens ssp. arborescens)	Single plant found near Helendale; no others observed during surveys
4	Small-flowered androstephium (Androstephium brevifolium)	Slight possibility in Cronese Mountains, known occurrence in Cronese Valley, but not observed during surveys
	Sand linanthus (Linanthus arenicola)	Slight possibility in Cronese Mountains and Valley, but not observed during surveys
5	No species known or expected	
6	Cima milkvetch (Astragalus cimae var. cimae)	Slight possibility in Clark Mountains, but not observed during surveys
	Foxtail cactus (Coryphantha vivipara var. alversonii)	Slight possibility in Clark Mountains, but not observed during surveys

Table 3-4 (continued)
Summary of Known or Potential Sensitive
Plant Species Occurrence

Segment No.	Sensitive Species or Species of Special Interest[1]	Occurrence In or Near the Proposed Corridor
6 cont	Rushby's desert mallow (Sphaeralcea rusbyi ssp. eremicola)	Slight possibility in Clark Mountains, but not observed during surveys
	Clark Mountain buckwheat (Erigonoum heermanii ssp. floccosum)	Slight possibility in Clark Mountains, but not observed during surveys
	Nelson's phacelia (Phacelia anelsonii)	Slight possibility in Clark Mountains, but not observed during surveys
7	Bicolored penstemon (Penstemon bicolor ssp. bicolor)	Several small populations in and adjacent to corridor near Jean, Nevada
	Golden bear poppy (Arctomecon californica)	One large population has been reported to occur in southern Las Vegas, west of Highway 15, not observed during surveys

with this species. The following information is based on the results of his survey (Krantz 1987).

It should be noted that the occurrence of slender-horned spineflower (Centrostegia leptoceras), also state- and federal-endangered, was evaluated during the field surveys because it occurs in the same region as woolly-star. As described by Krantz (1987), populations of this species were not observed nor expected within or near the proposed corridor.

Approximately 20 woolly-star plants were found along the south side of Baseline Road west of the Lytle Creek bridge in Rialto. The plants were all located outside the proposed area of disturbance for the cable (at least 50 feet from the road's edge). This population represents the southernmost extension of the Lytle Creek population.

Sixteen small woolly-star plants were found 0.3 mile north of Institution Road on the west side of Cajon Boulevard, about 2.5 miles south of Devore. The plants were mostly immature and scattered about, 30 to 50 feet from the edge of the existing paved road. Most of the plants were within undisturbed scrub-grassland, away from the roadside. Several small plants were located within the disturbed and brush-cleared roadside, directly adjacent to the proposed 20-foot-wide cable corridor.

Bicolored Penstemon

Bicolored penstemon (Penstemon bicolor ssp. bicolor) is a perennial herb with bicolored flowers. It is restricted to the mountain ranges of southern Nevada and is a candidate for federal listing (USFWS 1985a). Four populations of penstemon were located within and adjacent to the roadside corridor in southern Nevada. Plants were in fruit, so it was not possible to identify to subspecies. Two subspecies (P. bicolor spp. bicolor and P. bicolor spp. roseus) co-occur throughout their range; however, the latter subspecies is no longer considered sensitive since it has been found to be more common than originally believed (USFWS 1985a; NNNPS 1987). Bicolored penstemon was occasional to common in washes throughout the portion of the route in southern Nevada. In addition, it appears the taxon colonizes and occupies disturbed habitats such as roadside areas.

Two populations were located in northern Ivanpah Valley. The first occurs 3.5 miles south of Jean along Highway 604. Plants were present on both sides of the road. There were approximately 40 plants on the north side of the road, many of which were within 10 feet of the cable centerline. Nine of the plants were growing in cracks of the asphalt, while the remainder were located on the gravel shoulder of the road. The second population occurs 4.2 miles south of Jean, also along Highway 604. Only three plants were present near the proposed centerline (stake "2+800") on the north side of the road. A single plant occurs on the other side of the road.

Two small populations also occur north of Jean along Highway 604. The first is located 1.5 miles north of Jean, where 31 individuals were found between route stakes "6+800" and "7+000" on the north side of the road. The plants were growing on the gravelly road shoulder, about 15 feet south of the staked cable route. Approximately 29 plants were found 1.7 miles north of Jean in the same conditions.

Species of Special Interest

One of the species of special interest listed in Table 3-2 was found along the proposed route during the field surveys. A single individual of Mojave indigo bush (Psorothamnus arborescens var. arborescens) occurs southeast of the Mojave River on National Trails Highway, 1.7 miles north of the intersection with Vista Road. The plant was found in a wash on the south side of the road, within 50 feet of the proposed cable centerline. Mojave indigo bush is included on the low priority CNPS List 4 (Smith and York 1984); this list includes plants that are of limited distribution (but not rare or endangered) whose status deserves monitoring.

No other species of special interest was observed along the route during the field surveys. However, sand linanthus and Nelson's phacelia could potentially occur near the corridor in localized areas, as described in Table 3-4.

Sensitive Vegetation Types

The proposed route traverses only a limited amount of sensitive vegetation types. A small amount of alluvial fan scrub occurs on the south side of Baseline Road west of the Lytle Creek bridge in Rialto. This area represents the embankment and approach for the bridge. In addition, it occurs within a highly urbanized area. As such, it has been variously disturbed and does not represent a good example of this rare vegetation type. The Valley Wells shadscale scrub assemblage occurs adjacent to the corridor in the vicinity of Valley Wells Station (BLM 1980).

Riparian woodland occurs at the Mojave River crossing near Helendale. It is dominated by willow and cottonwood trees. Desert wash vegetation is traversed by the route throughout the Mojave Desert. Notable areas include the Mojave River south of Helendale and west of Barstow (Segments 2 and 3, respectively), Cronese Valley and Halloran Wash (Segment 5), and portions of the Clark Mountain Pass (Segment 6). No permanent wetlands are traversed by the route. The dry lake bed in Ivanpah Valley, and low-lying areas in Cronese Valley, Hinkley Valley, Halloran Wash, and Shadow Valley may contain ephemeral water after storm runoff.

Wildlife Resources

Legally Protected and Other Sensitive Species

As described previously, the Gila monster is only expected to occur on the southern Nevada portion of the route. However, it is not expected to occur within or adjacent to the proposed corridor because: (1) it is expected to be very rare in the region based on available data, and (2) suitable habitat conditions are not present along most of the proposed roadside corridor.

The route traverses desert tortoise habitat of varying population density throughout much of the central Mojave Desert. The locations of tortoise habitat along each segment are described in Table 3-5. No desert tortoise or their sign (burrows, shells) were observed during the field surveys. Tortoise are expected to occur very infrequently within or adjacent to the proposed corridor at the locations listed in Table 3-5 because the roadside habitat is comparatively poor for this species due to vegetation clearing, application of gravel and asphalt, compacted soils, and disturbances from traffic (noise, vibrations, nighttime lighting). However, BLM has indicated desert tortoise are common along the west side of Interstate 15 from Jean, Nevada to the state line.

The Mohave ground squirrel is patchily distributed along the route from near Adelanto to near Helendale. It is occasional to common in localized areas of its range. Several squirrels were observed during field surveys in the desert scrub vegetation adjacent to the proposed corridor. No squirrels or burrows were observed directly within the corridor. It is likely that Mohave ground squirrels utilize portions of the roadside corridor from south of Adelanto to Helendale for travel and limited foraging. Very few, if any, squirrels are expected to establish burrows along the corridor due to reasons listed above for the desert tortoise.

Other sensitive species may occur along highly restricted portions of the route. The San Diego horned lizard and orange-throated whiptail occur in low numbers and the localized area of Cajon Canyon, particularly in wash habitats. Neither species is expected to occur within or adjacent to the corridor in this area, except on a very rare basis. The ferruginous hawk is expected to be a fairly common (non-breeding) winter visitor in the Mojave Desert and could forage over and near the proposed route. A permanent bighorn sheep population is present in the high elevations of the Clark Mountains. Sheep are not expected to travel or forage in or near the proposed corridor in these mountains due to the proximity to roads and automobiles. No other known permanent or seasonal habitat for bighorn sheep is traversed by the proposed route. However, it is possible that a few bighorn sheep may occasionally use the southern portion of the Spring Mountains in Nevada. The proposed route crosses the southern tip of this range in the vicinity of a casino development and is not expected to affect bighorn sheep.

Sensitive Habitats

The proposed route traverses portions of the ranges of Mohave ground squirrel and desert tortoise that support high densities of these species. However, as noted above, these species are expected to be rare or absent from the roadside corridor itself. High density populations may occur in undisturbed habitat away from the roadway and the proposed route.

The proposed route crosses the Mojave River near Helendale. Riparian woodland, dominated by willows and cottonwoods, is present in the main river channel. No riparian vegetation is present within or adjacent to the corridor on either side of the existing bridge. Riparian woodland along the Mojave River may provide nesting habitat for rare spring-breeding birds such as the yellow warbler, willow flycatcher, and the more common yellow-breasted chat. There are also historic records of the legally protected least Bell's vireo and yellow-billed cuckoo occurring along the river.

Potential raptor nesting habitats for the golden eagle and prairie falcon occur along the route in remote, rugged mountains, including the Watermann Hills, Cronese Mountains, Soda Mountains, Halloran Wash (Negro Head), Clark Mountains, and Sheep and Spring mountains (in Nevada). Based on the results of the field surveys, potentially suitable nesting habitat is at least 0.5 mile from the proposed roadside corridor.

LAND USE AND JURISDICTION

The land use inventory included land jurisdiction, and significant existing and proposed land uses including lands designated for parks and preservation, which are located in the path of the proposed route and in the vicinity of the adjunct repeater station sites. Representatives of appropriate governmental and private agencies were contacted to verify or supplement information as required.

Overview

The proposed route extends through two counties in California and Nevada. The route utilizes existing state, county and city road and street rights-of-way, as well as existing utility rights-of-way. Land jurisdiction has been inventoried for the length of the proposed route according to BLM surface status maps and city land data, and is summarized in Table 3-6. The total route length is approximately 231 miles. Land jurisdiction and existing land use, along the route and at repeater station sites, are described below by state from southwest to northeast.

TABLE 3-5
SUMMARY OF KNOWN OR POTENTIAL SENSITIVE WILDLIFE SPECIES AND HABITAT OCCURRENCE

Segment No.	Sensitive Species[1]	Location
1	San Diego horned lizard and orange-throated whiptail	Cajon Canyon
2	Mohave ground squirrel	Near Adelanto and north
	Desert tortoise	Near Adelanto and north
	Potential riparian breeding birds	Mojave River crossing near Helendale
3	Desert tortoise	Most of segment
	Potential raptor nesting habitat	Waterman Hills
4	Potential raptor nesting habitat	Cronese Mountains
5	Desert tortoise	Baker to near Halloran Spring and in Shadow Valley
	Potential raptor nesting habitat	Soda Mountains and cliffs above Halloran Wash
6	Desert tortoise	Shadow Valley and Ivanpah Valley
	Potential raptor nesting habitat	Clark Mountains
	Bighorn sheep	Clark Mountains
7	Desert tortoise	Ivanpah Valley and between state line and Jean
	Bighorn sheep	Sheep and Spring Mountains
	Potential raptor nesting habitat	Sheep and Spring Mountains

[1]Protection status of species described in text.

TABLE 3-6
JURISDICTIONS CROSSED BY CABLE ROUTE

State	County	Private	BLM	National Forest	State Lands	Total	
California	San Bernardino	116	72	8	2	198	Miles
		59	36	4	1	100	Percent
Nevada	Clark	10	23	0	0	33	Miles
		30	70	0	0	100	Percent
Total		126	95	8	2	231	Miles
		55	41	3	1	100	Percent

California

In California, the proposed route traverses approximately 198 miles, beginning in Rialto in San Bernardino County. The route extends through three incorporated communities from Rialto to Adelanto. City street rights-of-way will be used for about 11.6 miles. Land use along the proposed route through urbanized areas is generally characterized by industrial, commercial and residential uses. Land along the route between the urbanized areas is generally open desert and, at higher elevations, forest. In California, approximately 36 percent of the route is along BLM lands, 4 percent along land administered by the San Bernardino National Forest of the US Forest Service (USFS) and 59 percent along private lands. The remainder crosses State School Lands administered by the State of California.

The route begins in east-central Rialto near the intersection of Second Street and Sycamore Avenue. The proposed alignment follows Sycamore Street north, then goes east along Base Line Road to the city limits. The land uses through Rialto are predominantly residential, with some pockets of commercial uses along the route.

After leaving Rialto, the proposed route enters San Bernardino on Base Line Street, crosses open space along Lytle Creek, then traverses generally northwest throughout mostly residential and industrial lands, crossing alternately in and out of the city limits.

Outside San Bernardino, the proposed route enters San Bernardino National Forest. An existing MCI Telecommunications conduit will be utilized through the forest. The San Bernardino National Forest land, which the proposed route would cross, is characteristically timbered. The route traverses a little over a mile of Public Water Reserve in the forest.

North out of the San Bernardino National Forest, the alignment passes through the Baldy Mesa area enroute to the City of Adelanto. This area is characterized by low density residential and agricultural uses. At Adelanto, the proposed route passes through predominantly industrial land, with some residential, commercial, and open space uses. Immediately to the east of the alignment, George Air Force Base abuts 1.5 miles of the route.

North of Adelanto, the proposed route heads in a northeasterly direction toward Barstow. This area is mostly vacant rural land which the county has zoned Desert Living. Along the Mojave River some land is used for limited agriculture. There are several pear orchards and alfalfa farms in this region. Sand and gravel mining also occurs in the area of the Mojave River.

As the proposed route nears Barstow, it again passes near low density residential uses, including the unincorporated communities of Lenwood and Grandview. The alignment continues north on Lenwood Road, then east on State Route 58. Along State Route 58, the route passes low density housing and commercial properties. The proposed route is entirely outside of the Barstow city limits.

North of Barstow, in the area north of Lead Mountain, the proposed cable route does not follow any existing right-of-way and may cross several unpatented mining claims.

East of Barstow, the proposed route dips south to generally follow Interstate 15 from Yermo to the east. It is here that the alignment begins to encounter elevation and more open desert.

The route continues to follow south of Interstate 15 to the northeast. It passes about one mile south of the Calico Early Man Site Area of Critical Environmental Concern (ACEC) in the BLM California Desert District. The route passes near the unincorporated community of Harvard.

Further to the northeast, the alignment crosses Interstate 15 and the southern edge of the Cronese ACEC, and continues on the north side of the freeway. It passes just south of Soda Mountains Wilderness Study Area (WSA 242), and several miles north of Afton Canyon ACEC.

Southwest of Baker, the proposed route crosses Interstate 15 and traverses on the south side of the freeway for about 5.5 miles. The cable route then again crosses Interstate 15 to the north.

Just west of Baker, Interstate 15 and the Soda Lake shoreline begin to form the northern border of the East Mojave National Scenic Area. The scenic area follows the eastbound lanes of Interstate 15 to a point a few miles west of Mountain Pass where it crosses the highway and encircles Clark Mountain. The boundary again moves south of the interstate a few miles east of Mountain Pass. The cable route follows Interstate 15 through the Mountain Pass area totaling approximately 10 miles within the boundary of the East Mojave National Scenic Area.

The unincorporated town of Baker is traversed by the proposed route. The community is a small residential and commercial enclave in the desert.

Beyond Baker, the route follows Interstate 15 to the south of WSA 228 (Hollow Hills). The alignment also abuts Halloran Wash ACEC further east. Halloran Wash ACEC is so designated because of cultural resources within.

The route continues through the desert to just east of the community of Moutain Pass, where it follows Interstate 15 to the north. Just a few miles to the north of Mountain Pass is Clark Mountain ACEC, and two miles south lies Mescal Range Geologic Area ACEC. Neither ACEC is traversed by the proposed fiber optic cable route. BLM will require a conduit system for several miles in the Mountain Pass area, to accommodate future communication cables. Exact endpoints of this conduit system will be worked out between US Sprint engineers and BLM representatives.

The route then heads north from the Mountain Pass area, where it crosses Ivanpah Lake (dry), and continues to the California-Nevada state line.

Nevada

In Nevada, the proposed fiber optic cable route is approximately 33 miles long, from the California border north to Las Vegas. In the urban area, the land uses are primarily residential and commercial. Open desert with scattered residences occur in the non-urbanized zones. Approximately 70 percent of the route through Nevada is on BLM lands and 30 percent occurs on private lands.

The route is primarily desert from the California border to the urbanized, developed environs of Las Vegas. It passes through the community of Jean and generally follows Interstate 15.

VISUAL RESOURCES

Visual resources inventoried along the proposed cable route and repeater station sites include landscape character, scenic quality, sensitive viewers and Visual Resource Management (VRM) Classes.

California

Cable Route

The proposed route passes primarily through typical Mojave Desert terrain characterized by basin and range physiography and defined as broad, flat basins or valleys situated between rugged mountain ranges. Many of these basins are closed drainage systems, indicated by the presence of playas, which contain water during brief, wet periods. Between the valley floor and the foot of the mountain ranges is the bajada, a landscape largely dissected by washes. Vegetation encountered along the route is predominately characterized by creosote scrub and/or short bunch grasses found on sandy soils. The route occasionally crosses through stands of Joshua tree or denser, higher-statured shrubs that occur on rockier soils; however, most of the route crosses sparsely vegetated landscapes.

The Mojave River Valley provides sharp contrast to the desert landscape. This river changes from a sandy wash to an often flowing river with a broad floodplain and riparian area in the Helendale/Victorville and Afton Canyon areas. Color and texture contrasts are introduced into the landscape by denser, broad-leaf vegetation associated with the riparian zones, and by the agricultural development located in the floodplain. Rolling hills with light-colored sandy soils are immediately adjacent to the floodplain.

In the southwestern portion of the study area on Baldy Mesa, the route traverses through a chaparral plant community. This landscape is characterized by rolling hills and dense, short, shrubby evergreen vegetation.

The route predominantly crosses landscapes that commonly occur in the Mojave Desert, as evidenced by a Scenic Quality Class C designation for lands located along most of the route. This classification identifies those landscapes with features common to the physiographic region, as defined by guidelines in the BLM's Visual Resource Inventory Manual (Rel. 8-28). In addition, landscapes classified as Scenic Quality Class B are also traversed by the proposed cable route. These include Shadow Valley, Cronese Valley, a pass through the Soda Mountains, and the Mojave River near Barstow. The Mojave River near Helendale is classified as Scenic Quality Class A, indicative of a landscape with outstanding or distinctive features within the context of the physiographic region (USDI BLM 1980; Dames & Moore 1985).

Although traversing some areas of outstanding landscape, the proposed route is mostly adjacent to previously disturbed lands containing existing telephone cable, pipeline, railroad, road, transmission, power and telephone line rights-of-way. Through urban areas, including Barstow and Adelanto, the route is within existing street and road rights-of-way, most previously disturbed and lacking major vegetative growth. Land uses occurring in these areas include rural and dispersed residential, commercial, light industrial, and agricultural.

Sensitive viewpoints occurring in the project area include urban and rural residential areas found in or near the following communities: Rialto, Adelanto, Yermo, Barstow, Baker, Helendale, Toomey, Lenwood, Hodge, Mountain Pass, and Silver Lake. In addition, several dispersed recreation or preservation areas are situated adjacent to the route, such as the East Mojave National Scenic Area and Soda Mountain and Hollow Hills Wilderness Study Areas (WSAs). Approximately 10 miles of the cable route occurs within the East Mojave National Scenic Area. Sensitive travel routes include Interstate 15, where portions are designated as a San Bernandino County scenic route and eligible state scenic highway. Another eligible state scenic highway, California 127, is located north of Baker. Several other highways and county roads, also considered sensitive viewpoints, are of somewhat lower sensitivity than those already mentioned because they do not have a special scenic designation or eligibility. These include a portion of California 58 and Irwin Road, both north of Barstow; Lenwood Road, west of Barstow; California 68 (Nipton Road); National Trails Highway; Helendale Road; Baldy Mesa Road; and US 395.

The cable route primarily crosses through lands managed for VRM Class III and IV, which allow for partial retention and major modification to the visual resource, respectively. In contrast, VRM Class II is managed to retain the existing character of the landscape, allowing low-level changes only. VRM Class II landscapes are crossed in Shadow Valley, southwest of Baker, Cronese Valley, the Mojave River crossing west of Barstow, and where the route parallels the Mojave River near Silver Lake.

Repeater Station Sites

The following describes the visual character, scenic quality, sensitive viewpoints, and VRM classes on or adjacent to each repeater station site.

Repeater Station #1 - Devore: The proposed repeater site is located near Interstate 15 between rolling hills and the mountains of the San Bernardino National Forest. The vegetation consists of chaparral community providing good visual absorption potential for visual changes. Modifications near the site include a railroad line and associated structures, dirt roads, interstate highways, and two parallel high-voltage transmission lines. Sensitive viewers are travellers on Interstate 15 and recreation users of the forest. This site would be classified as Scenic Quality Class C.

Repeater Station #2 - Highway 395: This site is located near the intersection of Helendale and Adelanto roads. The area is characterized by commercial uses and a residence located on the northeast corner. Cultural modifications include a pumping station, signs, power lines, and parking lots. Commercial buildings in the vicinity consist of a variety of architectural styles and materials. Sensitive viewpoints include the residence, although surrounding vegetation provides good screening of the site. High-use volume roads have moderate to low sensitivity due to commuter traffic use.

Repeater Station #3 - Rodeo Road: The proposed repeater site, classified as Scenic Quality Class C, is located on a flat site situated above the Mojave River Valley. The terrain to the south slopes upward providing some backdrop for the structure. It is bordered on the north and west sides by National Trails Highway and Rodeo Road, respectively. Some houses to the west have views of the site.

Repeater Station #4 - Irwin Road: The repeater site is located on a vacant lot surrounded by residences on the outskirts of Barstow. Views of the site from residences range from open to filtered by non-native vegetation. California 58 passes near this site. Other cultural modifications include fences, power lines and disturbed vacant lots. Sensitive viewpoints include high sensitivity residences along California 58 (the highway has moderate sensitivity).

Repeater Station #5 - Yermo Road: This site is located near Yermo Road, Interstate 15, and power line, telephone line and railroad rights-of-way. The interstate, located 0.25 mile from the site, is a designated scenic route in San Bernardino County, and an eligible California state scenic highway. Residences are situated 0.5 mile to the east. The site is flat with some screening potential from creosotebush in the vicinity. Other cultural modifications nearby include abandoned houses and a multiple line, high-voltage transmission corridor. The site is designated as Scenic Quality Class C.

Repeater Station #6 - Afton Crossing: The site is located 0.25 mile from Interstate 15, an eligible state scenic highway and designated county scenic route, in an elevated viewing position to the interstate. Gravelly hills to the north would provide some backdrop for the structure. A dirt road and telephone cable right-of-way are adjacent to the site. Other modifications in the vicinity include a gas station to the southwest and a billboard. This site is being managed for VRM Class IV and has been classified as Scenic Quality Class C. This site is south of the Soda Mountain WSA (this WSA is recommended nonsuitable for Wilderness (USDI BLM 1980)).

Repeater Station #7 - Baker: This site is located between the interstate right-of-way fence and an earthen levee. Vegetation consists of sparse creosote scrub surrounded by flat sandy playas. Sensitive viewpoints include Interstate 15 and the East Mojave National Scenic Area, all located south of the site. The interstate is being considered for scenic status in this area. The site has been classified as Scenic Quality Class B.

Repeater #8 - Halloran Summit: This site is located on the north side of Interstate 15 at the Halloran Summit interchange. Views of the proposed structure will be on the skyline to the interstate. A half-constructed residence is adjacent to the site. Other modifications in the vicinity include a transmission line and microwave tower some distance to the north. The site is flat and vegetated with low bunch grasses, allowing open views to the site. Several residences and a power line are located south of Interstate 15.

Repeater #9 - Nipton Road: This site is located in a disturbed area near the interstate off-ramp at Nipton Road. Damage due to off-road vehicle use is apparent. Terrain is hilly and vegetated with grasses and short yuccas. Although the site is not visible from the East Mojave National Scenic Area located south of the interstate, access to the recreation area provided by southbound Interstate 15 will allow views of the site. The BLM manages this site according to the objectives prescribed for VRM Class II, with a scenic quality designation of Class B.

Nevada

Cable Route

In Nevada, the proposed route passes through typical Mojave Desert terrain and an urban setting. In the desert, the terrain is typified by flat basins changing to rolling terrain, and finally mountain ranges. The soils are sandy and gravelly, with minimal vegetative cover consisting of low bunch grasses and scattered yuccas. Views tend to be extensive with distant mountain backdrops. This landscape setting has been designated by the Las Vegas District BLM as Scenic Quality Class C and VRM Class IV.

Much of the cable route is located in or adjacent to existing road rights-of-way, especially when traversing through urban settings such as Las Vegas. These areas tend to be previously disturbed and lack major vegetative growth. Land uses occurring in these areas range from residential to commercial.

Sensitive viewpoints in the project area include residences in or near Las Vegas and Jean. In addition, high-use volume travel routes such as Interstate 15 and Nevada 161 are also sensitive viewpoints, although these have somewhat lower sensitivity than residences.

Repeater Station Site

Repeater #10 - Jean: Just north of Jean, Nevada, this site is located on the west side of Interstate 15 and just north of Nevada 161. The site is on private land and the landscape has been disturbed with modification to surrounding drainages and vegetation removal. Other cultural modifications include power lines, signs, and light industrial uses within 0.25 mile. Moderate sensitivity viewpoints include Interstate 15 and Nevada 161.

SOCIOECONOMICS

The fiber optic cable route will pass through San Bernardino County in southern California and Clark County in southern Nevada. Cities encountered along the route include Barstow (19,500), Rialto (47,050), and San Bernardino (134,700) in California, and Las Vegas (190,930) in Nevada (population data 1985).

San Bernardino County's population is located mainly in the southwestern portion of the county, including Rialto. Clark County's population is located mainly in the center of the county, including Las Vegas. The populations of both counties are experiencing high growth rates. Information regarding current and projected population levels, personal income levels, taxable sales, and property taxes is presented in Table 3-7.

In terms of employment, the most prominent industrial section in Clark County is the services sector (46%), followed by the trade (21%), and government (12%) sectors. In San Bernardino and Riverside counties (data combined), three sectors dominate: trade (25%), services (22%), and government (20%), followed by manufacturing (12%). Neither county has substantial mining or agricultural sectors. A detailed breakdown of employment by sector is illustrated in Table 3-8.

CULTURAL RESOURCES

Introduction

Cultural resources are sites, places, objects, buildings, structures or districts that are of archaeological, ethnohistorical, historical, architectural, cultural or scientific importance. Such resources are protected by a series of Federal laws and statutes that must be addressed when cultural resources are threatened by federally sponsored, funded or licensed projects. Most notable among these are the Antiquities Act of 1906; the Historic Sites Act of 1935; the National Historic Preservation Act of 1966, as amended; the National Environmental Policy Act of 1969 (NEPA); the Archaeological and Historic Preservation Act of 1974, which amends the Reservoir Salvage Act of 1960; and the American Indian Religious Freedom Act of 1978.

State laws must also be followed in assessing potential project impacts to cultural resources. Major legislation that applies to the environmental review process in California includes the California Environmental Quality Act of 1970, the California Public Resources Code (21000 et seq.), and the Native American Historical, Cultural and Sacred Sites Act of 1976. At present, the state of Nevada does not have similar legislation applicable to cultural resources.

The study area for the proposed Rialto to Las Vegas fiber optic cable route has received considerable attention in recent years due to the environmental assessment of a number of proposed transmission line corridors and the establishment of the California Desert Conservation Area (CDCA) Plan. The present investigation has taken full advantage of the cultural resources investigations undertaken for these projects in preparing the cultural background data and compiling the baseline inventories. Projects of particular note in addition to the CDCA Plan include the Allen-Warner Transmission Project, the Ivanpah Transmission Project, the Victorville-McCullough Project, the Intermountain Power Project, and the Mead/McCullough-Victorville/Adelanto Transmission Project. Relevant studies conducted on behalf of these projects are cited below.

Construction of the proposed fiber optic cable project has been assessed to evaluate potential impacts to cultural resources in accordance with the legislation and guidelines cited above. The assessment is summarized by discipline in the following sections. Overviews of the prehistory, ethnohistory and history of the study area are followed by discussions of the methods employed to inventory the cultural resources along the proposed route. Inventory results, where available, are then tabulated. A discussion of potential impacts and recommended mitigation follows. Where the inventory effort has not yet been completed, preliminary results are provided. Final results and details of the studies will be available in the Technical Report prepared for the project (Dames & Moore 1987). Addenda to this report will also be prepared to accommodate any necessary archaeological testing reports and the assessment of ancillary facilities.

Overviews

The overviews summarize the cultural environment during prehistoric, ethnohistoric and historic times. Though these are brief, they are designed to provide a context in which to make the material that follows more meaningful. Detailed prehistoric, ethnohistoric and historic overviews are available in the Technical Report.

Prehistory

In the Cajon Pass area, some of the earliest work was performed by Gerald Smith. Many of the major archaeological sites in the region were recorded by Smith (Sayles, Yscaipa, Rock Camp, Liberty Groves (Cucamonga), etc.), which led to the first synthesis of the regional cultural sequence (Smith 1950). Later, Kowta (1969) conducted systematic archaeological excavation at the

TABLE 3-7
SOCIOECONOMIC INFORMATION

	San Bernardino County, California	Clark County, Nevada
Population 1985	1,086,400[d]	575,610[b]
Population 1990 (estimate)	1,283,600[d]	654,161[b]
Population Growth Rate 1985-1990 (average)	3.4%	2.6%
Total Personal Income, 1984	$12,166 million[g]	$6,829 million[g]
Per Capita Personal Income, 1984	$11,769[g]	$12,729[g]
Total Taxable Sales, 1985	$6,947,600,000[d]	$4,547,518,000[e]
Taxable Sales as a Percentage of Income	51%	70%
Property Taxes 1985-1986	$348,972,000[c]c	$161,925,027[b]
Property Tax Rate 1985-1986	1.14%[c]	2.27%[a]

a Adair, A. 1987. Clark County Assessors Office, Nevada.
b Astin, M. 1987. Clark County Treasurers Office, Nevada.
c California State Board of Equalization. 1985-1986. Annual Report.
d Center for Continuing Study of the California Economy, California Growth in the 1980s, County Projections, 1986.
e Las Vegas Review Journal, Nevada Development Authority, and First Interstate Bank, Las Vegas Perspective 1987.
f State of Nevada, Office of Community Services. Nevada Statistical Abstract 1986.
g U.S. Department of Commerce, Bureau of Economic Analysis. 1986. Survey of Current Business, April 1986 (Table 2, pages 45, 53).

TABLE 3-8
OCCUPATION BY INDUSTRY 1985
(in thousands of workers)

	San Bernardino and Riverside Counties, California (Combined Data)		Clark County, Nevada	
	Number of Workers (thousands)	Percent of Total	Number of Workers (thousands)	Percent of Total
Agriculture, Forestry, Fishing	22.6	4	1.2	less than 1
Mining	1.3	less than 1	0.2	less than 1
Construction	37.9	7	14.2	6
Manufacturing	66.0	12	7.8	3
Transportation/Public Utilities[a]	29.3	5	13.9	6
Trade[b]	132.3	25	52.1	21
Finance/Insurance/Real Estate	22.0	4	12.5	5
Services	118.8	22	113.4	46
Government	108.4	20	29.2	12
TOTAL	538.5		244.9	

a For Clark County, Transportation/Public Utilities includes the Communications Industry.
b Trade includes both retail and wholesale trade.

NOTE: The numbers may not add to the totals due to independent rounding.

SOURCES: U.S. Department of Commerce, 1986. California Statistical Abstract.
Las Vegas Review-Journal, Nevada Development Authority and First Interstate Bank, 1987.
Las Vegas Perspective, 1987.

Sayles Site in 1965 and 1966 in the Cajon Pass. Kowta concluded that the millingstone assemblage at the site represented a post-1000 BC remnant of an Archaic Millingstone/Pinto Basin continuum. A number of later projects have attempted to confirm Kowta's hypothesis with limited success (Allen 1982; Martz 1977; Salls 1983; c.f. Basgall and True 1985).

The report prepared for the Crowder Canyon Project in Cajon Pass (Basgall and True 1985) discusses the results of excavations during 1973 and 1974 under the direction of the California Department of Transportation. Four sites were subjected to detailed study. These included the Ridge Site (SBr-713), and three loci of the Sayles Site (SBr-421B, 421C, and 421D).

The research focused on issues of chronology, paleoenvironment, subsistence-settlement, exchange, work organization, and demography. An implicit emphasis was placed on "theoretical" and rather substantive issues concerning the Milling Stone concept as an integrative unit, particularly relevant for the definition of the inland milling adaptation such as Pauma as conceived by the second author (Basgall and True 1985:3.16-3.47). Few inland Archaic milling sites had been previously characterized or chronometrically dated. Perhaps one of the most important contributions of this project was the synthetic and integrative results focusing on this problem.

As suspected, the Milling Stone habitation in Crowder Canyon dated between approximately 1000 and 3000 B.P. with possible sporadic and sparse occupation as early as 5400 B.P. Major settlements were predictably located in the lower reaches of the canyon where water resources and the climate were more favorable. Inferred site activities emphasized subsistence, plant processing, and production. Faunal resources are poorly represented, and correspondingly, projectile points and other hunting related artifacts were uncommon. The authors conclude that the sites, even the larger loci, reflect predominantly women's subsistence activities and site use was generally sequential and seasonal.

While not framed within this mid-range theory, the sites seem to represent forager residential bases occupied for short periods of time and focused on specific resources (see Woods et al. 1987). If the concept of inland southern California Milling Archaic is correct, then this mobility strategy of mobile foragers seems most probable. While this concept has not been explored in this region, it is quite testable (Basgall and True 1985:10.26).

Scientific study of the archaeology of the California deserts began by Malcolm Rodgers (1939) and Elizabeth and William Campbell (1935; 1937) in the late 1920s and early 1930s. Basing their analyses primarily on surface materials, these early investigators were able to distinguish most of the archaeological complexes that serve today as the chronological framework for Mojave desert archaeology (Wirth Associates et al. 1981:4). Improvements in chronometric dating have led to revisions of the absolute dates assigned to these complexes, and revised terminological systems have been proposed (Lanning 1963; Wallace 1962; Warren and Crabtree 1972). In the discussion that follows, we adhere to the chronology proposed by Warren (Warren et al. 1980; Wirth Associates et al. 1981) and in use for the Fort Irwin Archaeological Project.

The Pleistocene Period (pre-10,000 BC) can be called a tentative cultural period in that artifacts attributed to this period in the desert either lack firm dating or have not been demonstrated to be man-made (Wirth Associates et al. 1981:6). The Manix Lake lithic industry, while clearly cultural, lacks firm dating. Proponents claim great antiquity on typological grounds, while critics argue that the industry simply represents the results of manufacturing activities from later periods. Early dates from the Calico Early Man Site near the study area have not been proven to be associated with real artifacts to the general satisfaction of archaeologists.

The earliest generally accepted cultural phase is the Lake Mojave Period, dated between 10,000 and 5000 BC (Wirth Associates et al. 1981:7). Artifact assemblages are characterized by long-stemmed and occasional fluted projectile points, flaked-stone crescents, specialized scrapers, a variety of flake tools and heavy core tools as choppers. Millingstones are absent. Major sites are often found in association with high lake stands. For instance, Lake Mojave period sites have been found on the shore of Silver Lake in the study area, and Silver Lake has lent its name to a distinctive projectile point type found there.

Lake Mojave Period sites can be seen as part of a larger pattern of early lake shore sites found throughout the Great Basin, Columbia Plateau and California (Bedwell 1970). It is often argued that the hunting of large game and/or the exploitation of lacustrine resources played a major role in the subsistence systems of these early peoples, but few floral and faunal assemblages have been recovered to verify this argument. The absence of millingstones suggests that the exploitation of hard seeds, so important in later economies, had not yet developed.

Interpretations of the Pinto Period (5000-2000 BC) in the Mojave vary widely. Warren et al. (1980) has argued that the Pinto Period represents a continuous development out of the Lake Mojave period. Others, including Wallace (1962), suggest that there was a cultural hiatus in many desert areas between 5000 and 3000 BC, induced by a climate more arid than today's. Pinto sites are seen as a new adaptation moving into the desert during wetter climatic conditions referred to as the Little Pluvial (ca. 3000 BC through AD 1). This argument is supported by the dates for Great Basin Pinto series points. However, proponents of the long chronology argue that the crudely made Pinto points from the California desert are typologically distinct and possibly older than "Pinto" points from the Great Basin (Jenkins and Warren 1986). A good series of radiocarbon dates for Pinto sites in California is needed to resolve this argument.

In the Mojave, the Pinto assemblage is characterized by Pinto series points, keeled scrapers, flake tools, choppers, flat grinding stones, and manos. Warren has argued that this assemblage suggests a generalized hunting and gathering economy (Wirth Associates et al. 1981:14). Pinto sites are often small and associated with ephemeral lakes, stream beds and springs (Jenkins and Warren 1986).

The subsequent Gypsum Period (2000 BC-AD 500) is identified by the presence of Humboldt Concave-base, Gypsum Cave or Elko Corner-notched points (Wirth Associates et al. 1981:15). Other characteristic artifacts include rectangular based knives, flake scrapers, t-shaped drills, manos and metates. Mortars and pestles were also introduced, as were Olivella and Haliotis shell beads. Split-twig figurines, thought to be associated with hunting ritual, have been found at Newberry Cave near the study area and dated to early in this period. Numerous zoomorphic petroglyphs are thought to date to the Gypsum Period as well. Warren has argued that this was a time of dynamic cultural change within the desert environment. Progress was made toward effective adaptation to aridity; new technologies were introduced to permit the processing of a variety of seed plants; hunting rituals were expanded; economic ties with other regions were expanded; and, toward the end of the period, the bow and arrow was introduced.

The Saratoga Springs Period (AD 500-1200) is seen as a period of strong regional developments in the Mojave (Wirth Associates et al. 1981:21). Warren identifies three areas of regional development. The eastern Mojave came under strong Anasazi influence, as evidenced by the presence at many sites of distinctive pottery types. The turquoise mines near Halloran Springs are thought to be the major impetus for contact with the Anasazi, but the degree to which the Anasazi actually occupied the desert is still an open question (Wirth Associates et al. 1981:22). Northwestern Mojave sites contain similar assemblages (Rose Springs and Eastgate series points, manos and metates, incised stones and slate pendants) as eastern Mojave sites, but lack Anasazi ceramics. On the other hand, developments in the southern Mojave are more closely allied with those of the lower Colorado River. The early (non-ceramic) portion of the sequence in the southern Mojave is poorly known. The Oro Grande site near Barstow is dated around AD 1000 (Rector et al. 1979:137), but lacks pottery altogether; Warren suggests an upwardly sloping terminal date for the "non-ceramic" period, representing the diffusion of Lower Colorado River pottery westward into the Mojave (Wirth Associates et al. 1981:25). It is not clear whether this pattern represents exchange, the use of the Mojave by groups from the Lower Colorado River culture area, or the borrowing of ceramic technology. The Oro Grande site is also notable for its abundance of Cottonwood series points and absence of Desert Side-notched points (Rector et al. 1979:137).

The Protohistoric Period (AD 1200-Historic) saw the establishment of the cultural patterns reported by the first Europeans to enter the area. Characteristic artifacts of this period in the north are Desert Side-notched points and Owens Valley Brownware ceramics. In the south and along the Mojave River, buff and brownwares indicate continued influence from the Lower Colorado River. Cottonwood Triangular points continue to be used. In the eastern Mojave the Anasazi influence ends at around AD 1150.

Trade with the groups from Lower Colorado and the California coast greatly expanded during the Protohistoric Period. The Mojave River apparently served as an exchange corridor during this time. Warren (Wirth Associates et al. 1981:26) has argued that:

> The trade along the Mojave must also have provided the middlemen of the region with opportunities to obtain relatively great amounts of wealth for a desert people. The large villages of the upper Mojave River (Smith 1963), the large quantity of beads recovered, and the general elaboration of the artifact assemblage suggest, this was indeed the case. In the late periods of Mojave Desert prehistory, trade must be considered another means of adaptation to the desert environment by which wealth and status could be obtained.

Sites of the Protohistoric Period include habitation sites with well developed midden located near reliable water sources, temporary camps representing seasonal forays into outlying areas, and a variety of resource procurement and processing stations.

Ethnohistory

A number of aboriginal Indian tribes incorporated portions of the study area within their traditional range. From west to east they include the Gabrielino, Serrano/Vanyume, Kawaiisu, Mojave, Chemehuevi and Southern Paiute. All of these tribes are Numic or Takic speakers of the larger Uto Aztecan linguistic stock with the exception of the Mojave who speak a Yuman language. In the higher elevations to the west these tribes practiced a hunting and gathering economy with varying degrees of dependence on the acorn and hunting and fishing for their principal subsistence. In the desert regions, plant foraging and the hunting of small game replaced the acorn and other highland activities in importance. Additional details on Indian subsistence and lifestyle during the ethnohistoric period are available in the Technical Report (Dames & Moore 1987) and the sources cited therein.

Considering traditional territory, the Gabrielino held those lands west of the Santa Ana River including the Rialto region. Just north of San Bernardino, the proposed route traverses Serrano territory through Cajon Pass and proceeds into the Vanyume range through the Victorville, Barstow and Baker areas. The Kawaiisu ranged the western portions of the desert from their homeland in the mountains to the northeast and the Mojave extended their subsistence range well into the Mojave Desert from their heartland along the Colorado River. The Southern Paiute in southwestern Nevada and the Chemehuevi to their south also expanded their subsistence activities westward into the California desert.

Contemporary representatives of each of these tribes along with appropriate agency personnel were contacted to solicit input for the project (see Agencies and Persons Consulted). An inventory of Native American (ethnographic/ ethnohistoric) resources situated along the cable route was generated from archival sources and the contact program. The inventory is described below. Native American concerns are currently being documented and will be discussed in the technical report.

History

The history of the study area is marked by exploration, immigration, mining, railroad development and automobile travel. Transportation has been the major theme throughout, and is reflected in the large number of trails, roads and railroad lines included in the inventory of historic resources. Support facilities, such as wells, railroad stations and highway settlements lend additional emphasis to the importance of the study area as a historic travel corridor.

Father Francisco Garces, a Spanish missionary, entered the project area in 1776 on his journey west from the Colorado River. Led by Indian guides, he traversed the Mojave Indian Trail in his successful attempt to discover a direct route from New Mexico to the San Gabriel Mission (Casebier 1981). Jedediah Strong Smith, the first American to reach California via an overland route, traveled the Mojave Indian Trail fifty years after Garces. Other mountain men and trappers soon followed Smith's lead, journeying westward into California over the Mojave Indian Trail during the late 1820s (Stickel and Weinman-Roberts 1980). Commercial caravans utilized the project area as a travel corridor in the 1830s and 1840s, leading their pack animals along the Old Spanish Trail on their way from Santa Fe to Los Angeles. The Spanish Trail was also used by Americans emigrating overland to California in the 1840s, during the early phases of westward expansion.

The trade and travel routes established throughout the project area during the Spanish and Mexican periods of California's history experienced a rapid rise in use with the coming of the American period. The Mexican-American War (1846-1848) increased in military traffic over the Old Spanish Trail as troops marched into California (Greenwood and McIntrye 1979). The signing of the Treaty of Guadalupe-Hidalgo in 1848 ended the war with Mexico; gold was discovered at Sutter's Fort that same year. These two events played an important role in stimulating freight and emigrant traffic into California and through the study area (Warren and Roske 1981). Mormon settlement in the San Bernardino Valley in the 1850s established a travel corridor through the project area connecting Salt Lake City and southern California.

Because it served primarily as a travel corridor, settlements within the study area were slow to develop (Warren et al. 1980). Mining activities generated a gradual growth in small communities, beginning as early as the 1860s. The arrival of two major desert railroad lines (the first in 1883) along with numerous branch lines, did much to promote additional mining and settlement activities. Numerous townsites located within the project area originally developed as local mining centers or railroad stations. Agriculture and cattle ranching, while not as significant commercially as mining, were also among the economic activities pursued within the study area (Greenwood and McIntyre 1979).

Several highway-oriented settlements emerged as a result of increasing desert auto traffic during the late 1920s and early 1930s (Norris and Carrico 1978). Early automobile routes found within the study area include the National Old Trails Road and the Arrowhead Trail (Warren et al. 1980). These highways were improved as their use increased; way stations and small towns were established along the routes to meet the needs of the growing numbers of motorists. Hallo and Midway emerged as minor towns on the Arrowhead Trail, and are included in the table of historic resources for the project area.

Previous Research

Inventories of previously recorded prehistoric, ethnohistoric and historic sites along the cable route study area were compiled to assess the impact of the project on known sites. Inventory information was gathered from a review of archaeological sites and survey records at the clearinghouse of the California Archaeological Inventory at the University of California, Riverside, the National Register of Historic Places and other historic registers and literature, and appropriate literature sources for the aboriginal tribes situated along the cable route. Agency personnel were also contacted for firsthand knowledge of cultural resources in the study area. Included were BLM archaeologists from the Riverside District office and the Barstow and Needles Resource Areas in California, and the Las Vegas District office and the State Line/Ismerelda Resource Area in Nevada. In compiling the ethnographic inventory, data previously collected by Lowell Bean and associates of CSRI was particularly useful. Numerous historical references were also consulted in developing the historic resources inventory and the historic overview. Specific citations are provided in the References section.

The Rialto to Las Vegas cable route study area has received considerable archaeological attention in recent years, both for the assessment of impacts of proposed transmission corridors and for the establishment of the CDCA Plan (BLM 1980). Some of the projects conducted in or near the present study area include:

1. The Allen-Warner Project's Baker and Silurian routes, surveyed at the 20 to 25 percent level by the University of California at Riverside (Barker et al. 1979);

2. The Ivanpah Project's preferred route, intensively surveyed by the University of California at Riverside (Hall et al. 1981);

3. The Victorville-McCullough lines 1 and 2, intensively surveyed by Greenwood and Associates (Greenwood and McIntyre 1979);

4. The Intermountain Power Project (IPP)-Adelanto Bipole I line, intensively surveyed by Applied Conservation Technology (Macko et al. 1982; Tucker 1982);

5. The Mead/McCullough-Victorville/Adelanto Transmission Project intensively surveyed by WIRTH Environmental Services (Dames & Moore 1986); and

6. Man and Settlement in the Upper Santa Ana River Drainage: A Cultural Resources Overview (Altschul et al. 1984).

These data are supplemented by archaeological overviews and sample inventories conducted by the BLM. Particularly relevant to the present project are the overviews of the western Mojave Desert (Stickel and Weinman-Roberts 1980) and the northeastern Mojave (Warren et al. 1980) and sample surveys of the Olwshead/Amargosa and Mojave Basin planning units (Brooks et al. 1979), the northeastern Mojave (Coombs 1979a), and the western Mojave (Coombs 1979b). Because of the large number of previous studies, it was decided early in the scoping process that the cultural resources studies for the present environmental assessment should rely as much as possible on existing information.

The inventories of previously recorded cultural resources resulted in the tabulation of 83 prehistoric sites and 19 prehistoric isolates (Table 3-9), 23 ethnohistoric sites (Table 3-10), and 43 historic sites (Table 3-11) situated within one-quarter mile on either side of the proposed cable route. All of these site locations were transferred to project field maps for further investigation during the intensive archaeological survey.

Vehicular Reconnaissance

A vehicular reconnaissance (windshield survey) of the proposed route was undertaken by two archaeologists on June 1 to 2 of 1987 to identify areas in which an on-foot survey of the route was not warranted. Reasons for not surveying a particular area included previously conducted cultural resources surveys and previous disturbance such as cutting and filling, or ground cover such as concrete or asphalt paving. Prior to the windshield survey, a meeting was held with a US Sprint engineer to discuss details of the route and any potential reroutes. The entire route was driven except for a few areas where poor access or no access was available. The Cajon Pass portion of the project where the cable is to be routed through an existing conduit was not inspected because no impacts are anticipated in this area.

Results of the vehicular reconnaissance are provided in Table 3-12. Overall, on-foot survey was found to be unnecessary for approximately 40 percent of the route. The remaining 60 percent was surveyed. Although a number of cultural resources surveys have been conducted in the general project area, few have been conducted in the immediate project area. Previous surveys, therefore, were not a frequent criteria for survey decisions.

Intensive Survey

An intensive archaeological survey to determine the nature and extent of prehistoric, ethnohistoric, and historic cultural resources along the entire proposed route has been completed, and subsurface evaluation is currently underway. During the survey, particular attention was devoted to the 20-foot potential direct impact zone and the 100-foot potential indirect impact zone. Ancillary facility sites, such as repeater stations, were also surveyed. Specific recommendations for mitigation will be tendered based upon the completed intensive survey and subsurface evaluations as outlined in the Technical Report (Woods et al. 1987). Mitigation procedures, which may include archaeological data recovery and construction monitoring, will be reviewed with appropriate representatives of the BLM and SHPO prior to implementation.

Survey Results - Prehistory

The pedestrian survey identified 10 prehistoric and 2 historic sites not previously recorded. The boundaries of two previously recorded prehistoric sites (CA-SBr-1968 and CA-SBr-3694) were enlarged as a result of the field reconnaissance. In addition, 13 isolates (artifacts not associated with a site), 10 prehistoric and 3 historic, were found (Table 3-13). Descriptions of these cultural materials from west to east are presented below. Newly recorded sites and other sites along the cable route are mapped in Appendix D of the Technical Report.

Sites

CA-SBr-6019H

This is a very small scatter of late nineteenth or early twentieth century glass. Nine fragments of aquamarine glass were recorded that may be fragments of a canning jar, but no identifying attributes or embossing that could definitely identify the form were noted. Additionally, the top portion of a kerosene lamp glass chimney was located. This fragment has turned amethyst. These glass fragments may be related to the mining activity in the area and/or use of the road.

CA-SBr-1968

This large lithic procurement area was recorded in 1968 by members of the San Bernardino County Museum Association. The site, covering approximately one square mile, was reported to contain a scraper, "crude Early man type tools," and a variety of large stone tools. In addition to the prehistoric lithic reduction areas, evidence of historic mining activities was noted. Mining efforts in the area appear to have involved the excavation of several tunnels in the eastern portion of the site.

TABLE 3-9
PREVIOUSLY RECORDED PREHISTORIC RESOURCES
IN THE PROJECT AREA

Site Number	Description	Distance From Centerline in Meters
CALIFORNIA		
San Bernardino South 7.5'		
PSBR-14	Village (location uncertain)	?
San Bernardino North 7.5'		
PSBR-14	Village (location uncertain)	?
Devore 7.5'		
CA-SBr-1397	Bedrock milling	250
Cajon 7.5'		
CA-SBr-A1333-2	Isolate	175
CA-SBr-425	"Village"	175
CA-SBr-1459	"Olla, mano hammerstone"	300
CA-SBr-2302	Stone circle	350
CA-SBr-2670	"Village"	50
NRHP-K-76-514	Crowder Canyon National Register District	300
Baldy Mesa 7.5'		
CA-SBr-A1332-2	Isolate	125
Adelanto 7.5'		
No sites in project area		
Victorville NW 7.5'		
No sites in project area		

Table 3-9 (continued)
Previously Recorded Prehistoric Resources
in the Project Area

Site Number	Description	Distance From Centerline in Meters
Helendale 15'		
CA-SBr-2074	Lithic scatter	175
Wild Crossing 7.5'		
CA-SBr-187	Large residential base	100
CA-SBr-997	Lithic scatter	375
Hodge 7.5'		
No sites recorded in project area		
Barstow SE 7.5'		
No sites recorded in project area		
Barstow 7.5'		
CA-SBr-3677	Jasper, chalcedony quarry	10
CA-SBr-5076	Lithic scatter	300
Nebo 7.5'		
CA-SBr-1965	Lithic scatter	175
CA-SBr-1968	Large lithic procurement area, cleared circles	0
CA-SBr-4842	Lithic scatter	10
CA-SBr-4843	Jasper lithic scatter	50
CA-SBr-4844	Lithic scatter	75
CA-SBr-4845	Lithic scatter	75
CA-SBr-4846-H	Lithic scatter/historic military encampment	0
CA-SBr-4847	Lithic scatter (four loci)	100
CA-SBr-4848	Lithic scatter	10
CA-SBr-4849	Lithic scatter	75

Table 3-9 (continued)
Previously Recorded Prehistoric Resources
in the Project Area

Site Number	Description	Distance From Centerline in Meters
Yermo 7.5'		
P1811-4	Small lithics scatter (location uncertain)	?
CA-SBr-3171	Light density lithic scatter	0
CA-SBr-3754	Small lithic scatter	150
Newberry 15'		
CA-SBr-223	Large quarry and possible habitation site	225
CA-SBr-2129	Chalcedony quarry	200
CA-SBr-2591	Large lithic scatter	275
Alvord Mountain 7.5'		
CA-SBr-2131	Large lithic workshop	0
CA-SBr-3695	Small lithic scatter	0
CA-SBr-3696	Small lithic scatter	0
CA-SBr-4719	Small lithic scatter	50
Dunn 7.5'		
CA-SBr-3731	Lithic scatter	25
CA-SBr-4713	Lithic scatter	175
CA-SBr-4714	Small lithic scatter	75
CA-SBr-4715	Small lithic scatter	150
CA-SBr-4716	Small lithic scatter	20
CA-SBr-4717	Lithic scatter	250
CA-SBr-4718	Lithic scatter, cairns	125
CA-SBr-3694	Temporary camp(s), NRE	125
CA-SBr-5329	Small lithic scatter	50

Table 3-9 (continued)
Previously Recorded Prehistoric Resources
in the Project Area

Site Number	Description	Distance From Centerline in Meters
Cave Mountain 15'		
A204-9	Isolated flake	0
CA-SBr-128	Lithic/ceramic scatter	275
CA-SBr-3495	Large temporary camp	250
CA-SBr-3732	Habitation site	200
CA-SBr-3733	Habitation site	175
CA-SBr-3734	Habitation site	225
CA-SBr-4198	Complex habitation site	125
CA-SBr-5114	Habitation site	200
CA-SBr-5115	Small lithic scatter	0
CA-SBr-5126	Habitation site	25
CA-SBr-5128	Habitation site	275
CA-SBr-5351	Small habitation site	100
West of Soda Lake 7.5'		
A203-6	Ceramic scatter	225
CA-SBr-541	Quarry	0
CA-SBr-1068	Trails	0
CA-SBr-5236	Trails	300
CA-SBr-5385	Trail, rock alignment	300
Soda Lake North 7.5'		
CA-SBr-4311	Lithic scatter	0
Baker 7.5'		
A228-2	Mano	10
P228-6	Shoreline site (location unknown)	?
P228-7	Shoreline site (location unknown)	?
Halloran Springs 7.5'		
No sites recorded in project area		

Table 3-9 (continued)
Previously Recorded Prehistoric Resources
in the Project Area

Site Number	Description	Distance From Centerline in Meters
Turquoise Mountains 7.5'		
CA-SBr-2528	Petroglyph	350
CA-SBr-2529	Petroglyphs	300
CA-SBr-2530	Unknown	125
CA-SBr-2531	Petroglyphs	75
CA-SBr-2532	Ceramic scatter	50
CA-SBr-2533	Petroglyphs	200
CA-SBr-2534	Petroglyphs	125
CA-SBr-2535	Petroglyphs	30
CA-SBr-2536	Petroglyphs	30
CA-SBr-2548	Hunting blind	200
CA-SBr-2549	Stone circle, hunting blind?	300
CA-SBr-2550	Petroglyph	275
CA-SBr-2552	Stone circle, hunting blind?	30
CA-SBr-2553	Stone circle, hunting blind?	100
CA-SBr-2555	Milling slick	175
CA-SBr-2556	Stone circle, hunting blind	325
CA-SBr-2559	Three rock circles	50
CA-SBr-5653	Bedrock milling	100
CA-SBr-5654	Cupules in bedrock	175
Solomons Knob 7.5'		
CA-SBr-2560	Rock alignment	75
CA-SBr-2561	Petroglyph	325
CA-SBr-2562	Rock alignment	250
CA-SBr-2563	Rock alignment	125
CA-SBr-2564	Rock alignment	30
CA-SBr-2681	Petroglyphs	200
CA-SBr-3729	Lithic scatter	15
Valley Wells 7.5'		
CA-SBr-133	"Campsite"	200
CA-SBr-712	Lithic scatter	10
CA-SBr-2690	Temporary camp	175
CA-SBr-2961	Unknown	225
CA-SBr-4054	Intaglio/groundstone	400

Table 3-9 (continued)
Previously Recorded Prehistoric Resources
in the Project Area

Site Number	Description	Distance From Centerline in Meters
Mescal Range 7.5'		
P266-1	Unknown (location unknown)	?
CA-SBr-818	Roasting pit	100
CA-SBr-827	Roasting pit	25
CA-SBr-828	Roasting pit	150
CA-SBr-834	Roasting pit	275
CA-SBr-856	Roasting pit	0
CA-SBr-858	Roasting pit/ceramics	200
CA-SBr-2982	Roasting pits	400
Mineral Mill 7.5'		
A225-5	Lithic tool isolate	25
Roach 7.5'		
No sites recorded in project area		
NEVADA		
State Line Pass 7.5'		
26-CK-3835/ BLM 5026	Isolate - flake	50
26-CK-3820/ BLM 5011	Scatter of fire-affected rock; 1 flake	100
26-CK-3821/ BLM 5012	Lithic scatter and fire-affected rocks	150
26-CK-3822/ BLM 5013	Lithic scatter and fire-affected rocks	100
26-CK-3823/ BLM 5014	Temporary camp	75
26-CK-3824/ BLM 5015	Temporary camp	75
26-CK-3825/ BLM 5016	Temporary camp	25
26-CK-3836/ BLM 5027	Two (2) isolates - flakes	150
26-CK-3826/ BLM 5017	Temporary camp	300

Table 3-9 (continued)
Previously Recorded Prehistoric Resources
in the Project Area

Site Number	Description	Distance From Centerline in Meters
Roach 7.5'		
26-CK-3834/ BLM 5025	Two (2) isolates - flakes	50
26-CK-3827/ BLM 5018	Lithic scatter	275
26-CK-3828/ BLM 5019	Isolate - core fragment	75
26-CK-3829/ BLM 5020	Isolate - flake	100
26-CK-3830 BLM 5021	Isolate - flake	150
26-CK-3831/ BLM 5022	Isolate - flake	75
26-CK-3832/ BLM 5023	Two (2) isolates - flake, biface fragment	75
26-CK-3833/ BLM 5024	Lithic scatter	75
26-CK-3436	Isolate - flake tool	25
26-CK-3817/ BLM 5008	Intaglio	125
Goodsprings 15'		
26-CK-3538	Isolate - flake	350
26-CK-3816/ BLM 5007	Tempoary camp/hearth	25
Sloan 15'		
26-CK-2238	Temporary camp/rockshelter	375
CRNV-53-3358	Isolate - mortar	250

TABLE 3-10
ETHNOGRAPHIC RESOURCES

Site Number I	Site Type II	Site Location III	Distance from Centerline in Miles West	IV	East
145	Kaampu'u; Wa'atsngna (San Bernardino)	San Bernardino North 7.5' quad San Bernardino South 7.5 quad (nm)		-	
146	Kukwaniraganti (San Bernardino Mountains)	Devore 7.5', Cajon 7.5' and multiple quads (m)		adjacent	
147	Amuscopiabit or Musku-pia-bit (CA-SBr-425)	Cajon 7.5' quad (m)	0.1		
148	Wahinu-t	Cajon 7.5' quad (nm)		-	
* 21	Caucameat (CA-SBr-187?)	Helendale 7.5' quad or Wild Crossing 7.5' quad (m)	0.2		
* 75	Mojave River	Multiple quad (nm)		-	
149	Hodge Area	Hodge 7.5' quad (m)		0	
* 13	Barstow Area	Barstow 7.5' quad and adjacent quads (m)		0	
* 77	Mojave Trail	Multiple quads (nm)		-	
*132	Toomey (CA-SBr-2129)	Newberry 15' quad (m)	0.1		
* 31	Cronese Valley Cronese Mountain Cronese Basin	Cave Mountain 15' quad (m)		0	

*Corresponds to site number listed in ethnology inventory, Mead/McCullough-Victorville/Adelanto Technical Report

Table 3-10 (continued)
Ethnographic Resources

Site Number I	Site Type II	Site Location III	Distance from Centerline in Miles IV West	East
*105	Soda Mountains	Soda Lake North 7.5' quad and West of Soda Lake 7.5' quad (m)	adjacent	
*104	Soda Lake	Baker 7.5' quad and Soda Lake North 7.5' quad (m)		0.25
150	Baker	Baker 7.5' quad (m)	0	
* 46	Halloran Spring	Turquoise Mountain 7.5' quad (m)	0.35	
* 47	Halloran Wash	Halloran Spring 7.5' quad, Turquoise Mountain 7.5' quad and Solomons Knob 7.5' quad (m)	0	
* 99	Shadow Valley	Valley Wells 7.5' quad and Mescal Range 7.5' quad (m)	0	
* 78	Mountain Pass	Mineral Hill 7.5' quad (m)	0	
* 26	Clark Mountain	Mineral Hill 7.5' quad and Mescal Range 7.5' quad (m)	adjacent	
* 53	Ivanpah Lake and Valley	Roach 7.5' quad (m)	0	
151	Route of Salt Song	Roach 7.5' quad and multiple quads (nm)	-	

Table 3-10 (continued)
Ethnographic Resources

Site Number I	Site Type II	Site Location III	Distance from Centerline in Miles West IV	Distance from Centerline in Miles East IV
*144	Route of Southern Fox Song	Roach 7.5' quad and multiple quads (nm)	-	
152	Piigisi (Las Vegas Area)	Las Vegas 15' quad (nm)	-	

TABLE 3-11
INVENTORY OF HISTORIC RESOURCES

Site No.	Site Description	Site Location	Distance From ROW (in Feet)
1	Old First Christian Church Built in 1906; now offices and museum for Rialto Historical Society. Corner of 2nd Street and Riverside Avenue, Rialto.	San Bernardino South 7.5 Minute	1200
4	Site of home of P.A. Raynor Built early 1870s. Site located between Riverside Avenue and Olive Street along "Packing House Row," north of Santa Fe Railroad tracks, Rialto.	San Bernardino South 7.5 Minute	1200
5	First Congregational Church Built 1890. Corner of First Street and Olive, Rialto.	San Bernardino South 7.5 Minute	800
6	Site of First Methodist Church Built 1888. Corner of Second and Date Streets, Rialto.	San Bernardino South 7.5 Minute	600
35	Mormon 1856 Baseline Road to Los Angeles. CHL #96. (SBr-4411H) National Register pending	San Bernardino South 7.5 Minute	0
39	P1071-1-H	San Bernardino North 7.5 Minute	0
36	Sawpit Canyon Road National Register pending (PSBr-4-H)	Devore 7.5 Minute	0
40	Cajon Canyon Road 1853 (PSBR-5-H)	Devore 7.5 Minute Cajon 7.5 Minute	0-1200
7	Baldy Mesa Road Route follows road. (SBr-4252H)	Cajon 7.5 Minute Baldy Mesa 7.5 Minute	0

*Corresponds to site number listed in historic resources inventory; Mead/McCullough-Victorville/Adelanto Technical Report.

Table 3-11 (continued)
Inventory of Historic Resources

Site No.	Site Description	Site Location	Distance From ROW (in Feet)
7a	Baldy Mesa Branch Road Parallel tracks are preserved as erosional scars approximately 3.5 feet apart. (SBr-4252H)	Cajon 7.5 Minute	600-800
13	Hesperia Pole Line Utility line is shown on the 1941 Hesperia 15' quad; parallels route of Salt Lake-Santa Fe Trail in Sec. 36. (SBr-4255H)	Cajon 7.5 Minute	0
41	Browns Tool Road constructed in 1861 as wagon road to Holcombs mines. (SBr-4253H)	Cajon 7.5 Minute	0
20	Salt Lake - Santa Fe Trail (SBr-4272H)	Cajon 7.5 Minute	0
14	Oro Grande Wash - White Road Cutoff Road is shown on the Hesperia (1902) 15' quad surveyed in 1898. (SBr-4268H)	Baldy Mesa 7.5 Minute	0
15	Patterson Ranch - Warner Ranch Road Shown on the Hesperia (1902) 15' quad. It may have connected with Mormon Road. (SBr-4271H)	Baldy Mesa 7.5 Minute	0
35	Mormon Road	Baldy Mesa 7.5 Minute	0
16	Toll Road - Lanes Crossing Road predates the Southern California No. 1 USGS quad 1901 and the Hesperia quad 1902, both surveyed 1898-99. (SBr-4179H)	Baldy Mesa 7.5 Minute	1100
17	Canal Lane Historic Road The road is shown on the 1941 Hesperia quad but not the 1902 Hesperia quad.	Baldy Mesa 7.5 Minute	1500

Table 3-11 (continued)
Inventory of Historic Resources

Site No.	Site Description	Site Location	Distance From ROW (in Feet)
18	Historic Home Site - Duncan Road #1. (SBr-4180H)	Baldy Mesa 7.5 Minute	700
19	Cement Cistern - Duncan Road #2 Round, historic cement cistern, 4 feet diameter, approximately 6 feet deep. (SBr-4181H)	Baldy Mesa 7.5 Minute	400
33	Historic Can Dump - Duncan Road #3 Debris from 1940s, including rusted cans and glass. (SBr-4182H)	Baldy Mesa 7.5 Minute	800
20	Salt Lake - Santa Fe Trail. (SBr-4272H)	Baldy Mesa 7.5 Minute Helendale 7.5 Minute	0
35	Mormon Road	Helendale 7.5 Minute	0
43	Mojave Road; Rock Spring segment of Old Government Road. (SBr-3033H)	Helendale 7.5 Minute	0
30	Barstow - Silver Lake Road (Irwin Road) "This road has been in use since at least 1905 and runs north from the Mojave River at Barstow...It is shown in Mendenhall (1909) and Thompson (1921) USGS Water Supply Papers, and was renamed Irwin Road in 1942 after the development of Camp Irwin." (SBr-4525H)	Barstow 7.5 Minute	0
31	Waterloo Mine Railroad Narrow gauge railroad built in 1888 to haul ore from Waterloo Mine south to the Waterloo Mill at Daggett. Track was taken up in 1903 except for one mile used by American Borax; that was dismantled in 1907. (SBr-4085H)	Nebo 7.5 Minute	0

Table 3-11 (continued)
Inventory of Historic Resources

Site No.	Site Description	Site Location	Distance From ROW (in Feet)
34	Lamar Waterline A waterline running from the Lamar Mine southeast toward a shaft in the SE 1/4, SW 1/4, SW 1/4, of Sec. 28. (SBr-4094H)	Nebo 7.5 Minute	200
37	Military encampment with flag-pole site. (SBr-4846H)	Nebo 7.5 Minute	150
28	Abandoned Canal Approximately .7 meters deep with inside width of 1.5 meters. Cement sides appear to be made of local conglomerate. (P1811-5-H)	Yermo 7.5 Minute	600-1400
44	Union Pacific Railroad tracks, Salt Lake Route, built 1904. (SBr-1910H)	Yermo 7.5 Minute Newberry 15 Minute	75
*40	Toomey Station or siding on Union Pacific Railroad	Newberry 15 Minute	0-50
*39	Well	Newberry 15 Minute	1000
*105	Canal 1910 irrigation project. (P-180-1-H)	Newberry 15 Minute	500-1000
35	Mormon Road	Newberry 15 Minute	0
20	Salt Lake - Santa Fe Trail. (SBr-4272H)	Newberry 15 Minute	0
42	Unidentified mounds. (SBr-4720H)	Alvord 15 Minute	0-25
*32	Midway Highway town on the Arrowhead Trail.	Dunn 7.5 Minute	500-1000
29	Old Railroad Grade. (SBr-2340H)	Baker 7.5 Minute	0

Table 3-11 (continued)
Inventory of Historic Resources

Site No.	Site Description	Site Location	Distance From ROW (in Feet)
*23	Baker First known as Berry, the Tonopah and Tidewater Railroad renamed the station in 1908 in honor of its president, R.C. Baker. Later became a main stopping point on the highway.	Baker 7.5 Minute	0-50
* 9	Group of buildings with associated road	Halloran Spring 7.5 Minute	0-50
* 8	Group of buildings with associated road	Turquoise Mountain 7.5 Minute Halloran Springs 7.5 Minute	0-1500
* 2	Airway Beacon "In place by 1931."	Solomons Knob 7.5 Minute	700
*89	Yucca Grove Townsite and ore processing center for the Telegraph Mine during the 1930s. (P227-3-H)	Halloran Spring 7.5 Minute	0-50
*22	Old Traction Road Used for hauling borax and other commodities in the late 19th century.	Ivanpah Lake 7.5 Minute	0
Nevada			
*21	Well	State Line Pass 7.5 Minute	1400
38	Last Spike Marker	Goodsprings 15 Minute	0
24	Historic Railroad Camp Probably associated with the construction of the original railroad tracks to Los Angeles. Site contains a building foundation and outbuilding. (26-CK-3540)	Sloan 15 Minute	250

Table 3-11 (continued)
Inventory of Historic Resources

Site No.	Site Description	Site Location	Distance From ROW (in Feet)
26	Historic Railroad Camp Temporary camp linked to the construction of the San Pedro, Los Angeles and Salt Lake Railroad. Tent platforms and a stone oven located on site. (26-CK-3541)	Sloan 15 Minute	500
27	San Pedro, Los Angeles and Salt Lake Railroad Temporary Grade Portion "This is a small remaining segment of a temporary railroad grade at Sloan, Nevada." (26-CK-3542)	Sloan 15 Minute	0-100

TABLE 3-12
ARCHAEOLOGICAL WINDSHIELD SURVEY
SUMMARY OF RESULTS AND RECOMMENDATIONS

Route Segment	Condition/Impacts	Recommendation	Approx. Mileage
Rialto to Cajon Pass	Urban; road fill	No survey	13.5
Cajon Pass	Conduit	No survey	11.5
Baldy Mesa Road to Phelan Road	Open country	Survey	4.0
Phelan Road to Helendale Area	Cable in road fill and/or disturbed area	No survey	28.5
Helendale Area to Hwy 58 (National Trails Highway)	Open country (route in and out of road fill)	Survey (No survey according to BLM)	18.0
Hwy 58 to Irwin Road	Disturbance	No survey	6.0
Irwin Road to Ghost Town Road via Meadow Grove Road	Disturbance, open country	Survey	8.5
Ghost Town Road	Not flagged	May need survey	2.0
Calico Blvd to Yermo	Road fill	No survey	2.0
Yermo to Minneola Road	Developed, disturbance, road fill	No survey	4.5
Minneola Road to Baker	Open country	Survey	46.0
Baker	Developed, disturbance	Survey	2.0
I-15 Interchange East of Baker to Ivanpah Lake Bottom	Open country	Survey	43.0
Ivanpah Lake to California Nevada Border	Lake bed, disturbance	Survey	3.5
California-Nevada Border to Las Vegas	Open country; road fill; previous survey; urban; disturbed	Survey	31.0+

TABLE 3-13
US SPRINT FIBER OPTIC CABLE PROJECT
RIALTO, CALIFORNIA TO LAS VEGAS, NEVADA

ARCHAEOLOGICAL SURVEY RESULTS

Area Surveyed	Approximate Mileage	Number of Sites*	Number of Isolates
Baldy Mesa Road	4.0	0	0
Mojave River Crossing-Helendale	0.5	0	0
East of Helendale	1.0	0	1
Mojave River Crossing-Lenwood Road	1.5	0	0
Meadow Grove Road-Lead Mountain Area	6.0	2	1
Yermo to Manix	1.0	2	0
Manix to Baker	37.0	9	7
Baker to California-Nevada Border	49.0	1	2
California-Nevada Border to Sloan	19.0	1	2

*Includes some previously recorded sites.

In 1981, M. Learch submitted an update for Locus A, a large terrace in the northwest quadrant of the site. Eight to ten flake scatters were noted along with two possible hearths and two cleared circles.

During the survey for the Rialto to Las Vegas fiber optic cable it was determined that material similar to that recorded at CA-SBr-1968 extended further northeast than previously noted. Numerous rhyolite flakes were observed on the terraces immediately adjacent to Meadow Grove Road and the cable route. Colluvial action has covered some portions of the desert pavement in the area. Where these pavements are still exposed cultural material is evident, although the density of material appears to decrease at the northern edge of the site.

CA-SBr-6023H

This is a very extensive trash dump north of Yermo that appears to date to the 1920s through the 1960s. No aluminum was noted, placing the dump toward the early portion of the probable chronology. The dump measures over 180,000 m^2 and consists of a series of low trash mounds variously covered with windblown sand. Most of the items are household trash including bottles, ironstone, miscellaneous ceramics, tin cans, and some plastic. No hand-soldered cans, other than canned milk containers, or amethyst glass were noted. Bottle collectors have disturbed the integrity of the dump.

CA-SBr-3171

This site was originally recorded during the Victorville/McCullough Transmission Line 1 and 2 Project (Greenwood and McIntyre 1979). The site was characterized as a large (0.75 square mile) light density lithic scatter with some higher density areas. The site boundaries cross the US Sprint corridor, but no cultural material could be located in the impact area. According to Greenwood and McIntyre (1979), the area of the site crossed by the US Sprint line is in the lightest density area, so little could be expected. A diligent search was made, but nothing could be found. Additionally, the cable will pass through the road edge and a bulldozed area, probably the major reason cultural material was absent here.

CA-SBr-6022

This site, located east of Manix Wash, appears to be a relatively small chert procurement site. Numerous (100+) chert and chalcedony flakes were noted. Multidirectional and bifacial cores also occurred. The site is very similar to the more extensive Midway Site (CA-SBr-3694) one mile east.

CA-SBr-6021

This is a very small (200 m^2) light density lithic scatter similar to SBr-6022. It consists of one chert flake, one chalcedony flake, and two chalcedony multidirectional cores. Again, this site is similar to the large Midway Site (see below).

CA-SBr-6020

Unlike the last two sites, this area appears to be a small biface production site or workshop. Two biface fragments (one chalcedony, one brown chert) were located, as well as one chert multidirectional core. Over 40 flakes were also recorded, the majority less than 25 mm in length. It seems probable that there was one or more episodes of biface production, perhaps to produce preforms for later reduction. While this behavior may be found in other lithic procurement sites, it is masked by the sheer quantity of primary reduction in the sites.

CA-SBr-3694

This is an extremely large secondary siliceous sediment (chart) procurement site. The presence of cultural material corresponds with the presence of chert in the Quaternary alluvium. This "site" may cover many square kilometers wherever chert occurs. In an east-west direction, the site extends several miles west of Midway Rest Stop along Interstate 15, broken only by washes that cut through the conglomerate containing the chert nodules. It probably extends south to the Mojave River.

Abundant multidirectional cores and flakes of all sizes and morphology are found in varying densities throughout the site area. Density varies from 1 per 100 m^2 to 50 per 5 m^2 in reduction areas. Artifact density appears to be highest on the western end as a result of the higher density of raw material. This procurement site may have considerable time depth, although no time sensitive artifacts were observed to assess this. The lithic technology here appears to be quite redundant - reduced cores and flakes predominate.

This site was the subject of intensive survey collection, and minor subsurface testing (Adams and Cook 1979; Ancient Enterprises 1980). The collection and survey indicate probable long-term procurement of secondary siliceous sediments and "volcanics." One Lake Mohave point was recovered. The character of the site on the north includes lithic reduction areas, biface preforms, cores, and very few tools. The site was considered to be a Late Archaic lithic procurement and processing site although the only time sensitive artifact recovered was the Lake Mohave point (Ancient Enterprises 1980:37).

It is possible that this site is related to CA-SBr-2131 to the south that is another lithic procurement site with similar attributes (from site form). As noted in our survey, this region apparently functioned as a large lithic procurement area that was exploited for a long period of time. Due to rerouting, the site will not be directly effected.

CA-SBr-6018

Located on a probable Holocene shoreline of Cronese Lake, this site appears to be a remnant of a large residential base camp occupied during a lactustral interval. Abundant Anodonta spp. and Physa spp. shell in the site suggest a lacustral environment while the site was occupied. A full range of artifact types are represented here, in densities ranging from 1 to 10 artifacts per 5 m^2. Broken manos and metates, buffware ceramics (similar to Salton Buff), secondary and interior flakes, utilized flakes, projectile points (Cottonwood Triangular and Desert Side-notch), burned bone, fire-affected rock, and abundant shell are dispersed over the mesquite stabilized dunes and alluvium. Patches of dark soil near the dune areas may be hearth remnants. On the northern boundary of the site, a possible lagoon/marsh may have existed evidenced by a depression that leads out the lake basin. Flake lithic raw materials include cherts, jasper and chalcedony, probably from the Afton Canyon/Calico Hills sediments to the west. This site is similar to another shoreline site located on the east shore during the survey (CA-SBr-6017).

CA-SBr-6017

This site is very similar to CA-SBr-6018, across the lake basin. Also located in low dunes and mesquite stabilized dunes, the site appears to be a remnant of a residential base camp, although smaller than the site on the other side of the basin. The artifact density ranges from 1 to 5+ per 5 m^2. Groundstone was not recorded here, but one hearth area was recorded and fire-affected rock occurred sporadically throughout the site area. Interior flakes and utilized flakes of chert and chalcedony were recorded, as well as some buffware ceramics similar to Salton Buff in Holocene Lake Cahuilla contexts (Waters 1982). Anodonta spp. and Physa spp. shell were also common in the site area.

Both of these sites are probably remnants of a large occupation complex corresponding to lake intervals. The late period points and ceramics indicate a late prehistoric occupation.

CA-SBr-6015

This site, located on a volcanic ridge southwest of Baker, consists of a small rhyolite reduction area (10 m^2). Characterized as two rhyolite reduction stations, the site is located in an area of abundant silicic volcanic material. Station 1 consists of a rhyolite core 20 cm in diameter with 15+ flakes associated approximately 1.5 X 1 m in diameter. Station 2, to the east of 1, consists of a bifacial core, a multi-directional core fragment, and 8+ flakes. An isolated blade (A203-2) has been reported north of this site suggesting that this area probably served as a rhyolite procurement area. A trail/trail network is also recorded at the base of the ridge (CA-SBr-1068). The site itself is about 12 meters south of the proposed cable route and will probably not be affected by project construction. Due to a subsequent reroute through the area, this site will no longer be affected.

CA-SBr-6016

This site consists of a trail located on a saddle, probably leading to and from the Soda Lake area. Northwest of the saddle is a single trail, while southeast of the saddle the trail splits and continues on either side of the ridge. The length was difficult to determine, but it definitely runs for about one-quarter of a mile east toward Soda Lake. The trail may be part of a communication network to and from Soda Lake, as suggested by Benton (see site form for Ca-SBr-1068). Due to a subsequent reroute through the area, this site will no longer be affected.

CA-SBr-541

This site is characterized as a small (30 X 10 m) rhyolite quarry approximately 10 m north of Interstate 15 right-of-way fence and approximately 1.1 km east of Zzyzx Road (site form data). The site is bisected by the road that the cable alignment runs through. The character of the site was found to be the same as that originally recorded, so no update was attempted. As predicted by the original site recorders, Interstate 15 does impact the site as does the pipeline road that forms the corridor for the proposed Sprint alignment. The site consists of very low density (1 per 5 m^2) of scattered rhyolite cores and flakes. No time sensitive artifacts were observed during the present survey. The rhyolite in the alluvium here is apparently the same as that on the sites found in the original survey (CA-SBr-6015) northwest of Interstate 15. The site form notes that Norm Nakamura "excavated" the site in 1965 and recovered 2,902 artifacts. The collection is under accession #506 at the Museum of California History. According to Nakamura the site is known as the "Baker Site."

CA-SBr-6030

This is a probable small field camp or temporary camp located in a Joshua tree community northeast of the Halloran Summit off ramp. The site consists of two slick granitic portable metates and one chert primary flake. The site meásures only 7.5 m in area and is situated well away from the direct impact area. One of the metates is partially buried, suggesting possible depth, but alluvial processes may be responsible for this phenomenon. No other cultural material was observed, but may be possible. The site may be a small extractive camp or location for residential bases elsewhere.

26-CK-3865

During the archaeological survey a rhyolite glass source that has not been previously reported was discovered near the Nevada-California state line in southwestern Nevada. The source may solve many of the "unknown" source provenience problems encountered in geochemical analyses of sites in the region. The glass was found to be an excellent medium for the production of stone tools, although the nodule size is generally small, typical of middle to late Tertiary glass sources (Shackley 1987).

Environment and Location

The deposit is located near and east of Devil Park, particularly on the bajada and alluvial plain east of the Spring Mountains. The entire source area was not surveyed, but the secondary deposit may extend to the Roach Lake shoreline approximately 8 km east of Devil Peak. It definitely extends to present Interstate 15, although the nodule size and density is not as great as the western area of the deposit.

The current environment in the source area is a dispersed creosotebush (Larrea tridentata) community with little other vegetation. A number of mining roads and Interstate 15 impact the site, but the size of the secondary deposit is so great that these impacts are minor. There are no permanent water sources nearby, and as noted below, no permanent prehistoric sites are recorded or were discovered in the area other than the reduced obsidian nodules.

Geology and Archaeology

This is a very large dispersed secondary deposit of glass nodules. The known area covers at least 17 square kilometers. The source consists of scattered pyroclastic nodules probably ejected from what is now a remnant rhyolite neck called Devil Peak (Longwell et al. 1965). The nodules are a part of a Quaternary alluvium that is dominated by various carbonate rocks mainly of the Monte Cristo Formation. The geological region is characterized by an abundance of carbonate rocks of Precambrian and Permian age, particularly Monte Cristo Limestone. A number of Tertiary intrusive and extrusive bodies occur along fault lines. The largest in the region is the subcircular rhyolite neck called Devil Peak. This is also the largest silicic volcanic body in the region (Longwell et al. 1965). Other extrusives include andesitic flows southwest of Goodsprings such as Table Mountain. The primary source itself (Devil Peak) consists of rhyolite tuff-breccias and perlite/vitophyre deposits. Some of the perlite structures may have contained glassy nodules, but were not evident during the survey. A modern, but abandoned perlite mine (Umpire Perlite Mine) occurs on the west flank of Devil Peak. Devil Peak evidently was quite explosive. Obsidian nodules are found as pyroclasts at least 10 km east of the rhyolite neck. As is typical with pyroclastic eruptions, the nodule sizes increases nearer the eruptive center due simply to the effect of gravity (Shackley 1987). Nodule sizes range from near pea size to 2 cm in diameter near Interstate 15, to greater than 7 cm in diameter in Sections 6, 7 and adjacent unnumbered sections. The density of unreduced nodules varies from 1 per 50 m^2 near Interstate 15 to 5 per 25 m^2 nearer Devil Peak.

The fabric of the nodules ranges from aphyric glassy rhyolite to nearly transparent glass. The glassy nodules are an excellent medium for the production of stone tools and a number of Cottonwood Triangular and Desert Side-notched projectile points were produced experimentally from the glass by Shackley. The more vitreous nodules outnumber the aphyric nodules at at least two to one. No phenocrysts were noted in any of the nodules in hand sample. Most of the nodules exhibit weathered velvet-like cortex and some still contain remnant tuff coating from the eruption.

No finished artifacts were noted in the area surveyed. Bipolar cores and flakes were relatively common especially nearer Devil Peak. The highest density of artifacts reached 5 per 25 m^2 in Section 7. The density of reduced nodules naturally followed the density of the pyroclasts in the alluvium.

Isolates

A1581-2-H. This consists of three fragments of amethyst-colored bottle glass. The material is south of the National Trails Highway. Other material in the area includes some unidentified fragmentary metal items and modern glass.

A1812-1. A single white chalcedony flake comprises this isolated find. This interior flake is located on a large plain east of Lead Mountain. The area is slightly sloping and the soil is sandy. The flake may be a secondary deposit.

A204-82. This chert biface fragment is located on a small ridge between Interstate 15 and the frontage road. The specimen is broken and measures only 5.5 cm by 4.5 cm.

A204-80. One jasper flake was recorded at this location. This isolated item is northeast of Afton Canyon in a valley which connects the Afton Canyon area with Cronese Basin.

A204-79. Two chert flakes were found 17 m apart. One is a red chert; the other is tan. Both are thinning flakes. The area is very sandy and other material could conceivably be buried by shifting sands. These items are a little less than one mile east of A204-80.

A204-78. This isolate is comprised of one chalcedony thinning flake. The flake measures approximately 5 cm by 3 cm, and although there is tertiary reduction no edge wear is evident. This item is a few hundred meters east of A204-79.

A204-81. These isolated finds are located on the eastern edge of Cronese Basin. One brownware body sherd and one chert flake were recorded within 20 m. Shifting sands could have buried other materials in the area.

A203-11. West of Soda Lake lies a possible cairn along the alignment (see Confidential Technical Appendices). The cairn appears to have originally been three small rhyolite or dacite rock piles that collapsed into one large (2 m X 0.7 m) cairn. No artifacts of any time period were associated with this feature. The feature is 6+ m southeast of the cable alignment.

A203-12. This is a historic isolate located along the old Barstow to Las Vegas road. The isolate consists predominantly of a broken glass bottle with "Klassy Fruit Drink, 6 1/2 ounce, KB 1927" embossed on the bottom. The glass appears to be slightly amethyst colored. Also noted in the area were a few pieces of probable window pane glass and metal fragments. These artifacts are probably deposited as trash from the use of the road.

A227-3. This isolated occurrence is located west of Halloran Springs and consists of two secondary brown-and-white mottled chalcedony flakes and a white grainy chert flake 15 m north of the other flakes. None of the flakes exhibited obvious use-wear. The three artifacts were located in a wash and probably migrated from upstream.

A226-6. Located along the old Barstow to Las Vegas road, this isolate consists of a single quartz crystal secondary flake (see Confidential Technical Appendices). The flake is situated in the berm along the side of the road and is probably not in primary context.

26-CK-3864. This location contains approximately 45 fragments of amethyst bottle glass. The fragments appear to be from one container. No diagnostic fragments were located. The scatter of glass is west of Old Highway 466 and 91, an early route through the area.

26-CK-3863. Approximately 0.4 mile east of 26-CK-3864, a single jasper flake was identified. It is located in a wash area north of the highway and appears to be a secondary deposit.

Survey Results - Ethnohistory

As discussed in the Technical Report (Woods et al. 1987), most of the inventoried ethnohistoric resources are coterminous with, or associated with, prehistoric resources. As such, none of the inventoried sites found were exclusively ethnohistoric and no new ethnohistoric sites or concerns were identified by the Native American participant on the archaeological survey. Some monitoring is recommended, however, for previously identified potentially sensitive ethnohistoric areas.

Survey Results - History

Inventoried historic resources situated within the right-of-way were assessed for potential impacts from installation of the fiber optic cable. Many of these sites were historic roads, trails, and railroads. It was determined that, for those resources which could be located, none would be subject to significant adverse project impacts. Some monitoring, however, is recommended for areas where historic debris might be found during construction.

Recommendations - Prehistory

Recommendations for the sites that remain in the potential impact area are explained in detail in the Technical Report. The following is a summation of those recommendations.

Sites

It is our opinion that recommendations concerning the significance of a site are best addressed after a subsurface evaluation/subsurface testing program and surface collection. However, most sites can be provisionally assessed based on surface evidence, previous studies in the region, and on similar sites (see Butler 1987). A summary of recommendations for the study sites is presented in Table 3-14. A design for subsurface evaluation of each of these sites is presented in the Technical Report. The recommendations presented here focus on potential project redesign to avoid or decrease the severity of direct impacts to the sites.

CA-SBr-1968. This large light density rhyolite procurement site seems to be fairly intact. It is impacted only by the access road and some off-road vehicle damage. The site is so large and light in density that these are not considered significant impacts. The cable alignment has been moved into the road. Construction should not affect the site, although construction monitoring is recommended.

The Cronese Lake Basin. This area is part of the BLM Cronese Lake ACEC. Due to the high potential for significant cultural remains, we recommended that the cable be rerouted into the existing AT&T access road through the entire basin. This was done. Two sites will, however, be potentially affected by cable construction (CA-SBr-6018 and CA-SBr-6017). Both sites are Holocene shoreline residential base sites that possess high integrity. A subsurface evaluation is currently underway. Of all sites in the project area, these two have the greatest potential for subsurface material. Rerouting of the cable may only place the proposed impacts in existing impacted areas of the site.

CA-SBr-6030. This is a small temporary camp or seed processing site that is located approximately 7 m south of the proposed cable alignment and may be more extensive than is evident, based on surface material. A subsurface evaluation program is currently underway for this site.

TABLE 3-14
US SPRINT FIBER OPTIC CABLE PROJECT
RIALTO, CALIFORNIA TO LAS VEGAS, NEVADA

SUMMARY OF PREHISTORIC SITE RECOMMENDATIONS

Site #	Description	Rationale	Project Effect	Recommendations
Cronese Lake Basin CA-SBr-6018 and -6017	Holocene shoreline residential bases	Good integrity, unique character	Direct impact, moderate affect	Cable reroute, subsurface evaluation program
CA-SBr-6030	Small temporary camp or processing location	High integrity	Possibly direct impact	Subsurface evaluation program

Isolates

A number of isolated finds were recorded during the survey. In most cases these were single flakes, debitage, or broken glass fragments. All the isolates are now recorded and we recommend no further work at these areas. One exception is through the Cronese Lake Basin where isolated finds may be remnants of buried dune deposits. In this area, a subsurface evaluation program for the entire alignment through the basin has been generated (see Woods et al. 1987).

Recommendations - Ethnohistory

Considering the close correspondence between ethnographic and archaeological sites and related concerns, mitigation procedures for both disciplines are similar. Native American monitors are recommended for the site evaluation programs at the Cronese Basin and Halloran Summit. In addition, a Native American monitor should be employed during construction through the Halloran Spring and Mountain Pass areas. Results of the testing program, the construction monitoring plan, and any other proposed mitigation procedures should be provided to appropriate Native Americans for review.

Recommendations - History

No recommendations are offered for those historic sites located in a known, extensively disturbed area, or for those sites which could not be located through an initial archaeological survey. Construction monitoring is recommended for three historic site areas. These include the townsites of Baker and Yucca Grove, and a site labeled "unidentified mounds" (CA/SBr-4720H) on the Alvord 15-minute quadrangle. No monitoring is necessary at Baker and Yucca Grove, however, if a plow is used to install cable. These sites should be monitored only if backhoe trenches are utilized.

PALEONTOLOGIC RESOURCES

A paleontologic assessment of the proposed cable route was undertaken by Robert Reynolds, Curator of Earth Sciences at the San Bernardino County Museum, during early June of 1987 and a Technical Report has been prepared (Reynolds in Woods et al. 1987). The report, summarized here, addresses the potential for project impacts to significant paleontologic resources on the basis of the paleontologic sensitivity of the rock units through which the proposed right-of-way will pass.

Paleontologic remains are recognized as nonrenewable resources significant to American culture, and are protected under federal, state and local statutes. These statutes provide for preservation and salvage of significant paleontologic resources. Significant paleontologic resources are fossils or assemblages of fossils that are unique, unusual, rare, uncommon, diagnostically or stratigraphically important, and those that add to an existing body of knowledge in specific areas, stratigraphically, taxonomically, or regionally. They include fossil remains of large to very small aquatic and terrestrial vertebrates; remains of plants and animals previously not represented in certain portions of the stratigraphy; and assemblages of fossils that might aid stratigraphic correlations, particularly those offering data for the interpretation of tectonic events, geomorphologic evolution, paleoclimatology, and the relationships of aquatic and terrestrial species.

The proposed cable route through Cajon Pass crosses sediments of the San Francisquito formation, the Cajon (Punchbowl) formation and the Crowder formation. (This section of the route will use the existing conduit system on National Forest lands.) The Adelanto section contains fossiliferous Pleistocene sediments that span the Irvingtonian/Rancholabrean land mammal age boundary (500,000 years B.P.) below elevations of 3,000 feet between Adelanto and Helendale. Sedimentary units of Irvingtonian land mammal age are avoided past the Helendale section.

Pleistocene and Miocene sediments of the Barstow formation through the Barstow section are known to be highly fossiliferous and the Yermo section of the route crosses relatively coarse-grained sediments of Pleistocene terrace deposits. At certain points through the Harvard section, the route crosses undisturbed sediments of Pleistocene Lake Mannix, which have provided a diverse assemblage of vertebrate fossils, and Pleistocene Mojave River sediments which have produced a varied and abundant fossil fauna.

Near Midway, the route between Mannix Wash and Afton Road crosses exposed sediments of the Mannix formation which elsewhere has produced a diverse assemblage of vertebrate fossils. The Cronese-Soda Mountains section crosses "Plio-Pleistocene" fossil-producing sediments (near the Afton offramp) and Pleistocene fanglomerates (in the Soda Mountains) which, however, have no record of paleontologic localities. The Mojave River drainage between Soda and Silver lakes in the Baker section may contain lacustrine and fluviatile deposits, and Miocene sediments known to produce vertebrate fossils are crossed between Baker and Halloran Summit in the Halloran area.

Pleistocene lacustrine sediments of Irvingtonian land mammal age are present in the Valley Wells area, and the Mountain Pass section crosses Paleozoic limestone and coarse Quaternary conglomerate. The Ivanpah Valley section crosses Pleistocene lacustrine sediments of both Ivanpah and Roach lakes.

Mitigation Measures

Mitigation measures adequate for protection of significant nonrenewable paleontologic resources must be applied for areas determined to have a high potential for containing significant fossil or fossiliferous soil horizons which would be likely to be impacted by backhoe and trencher excavation. All phases of mitigation will be under the supervision of a qualified professional paleontologist with appropriate permits and fieldwork authorizations from applicable agencies. Contractors and equipment operators should be made aware, however, that it is necessary to contact a qualified paleontologist if fossils are unearthed in the course of construction excavation at any point along the fiber optic cable route. The paleontologist will then salvage the resources and assess the necessity for further mitigation, if applicable. Possible mitigation measures are discussed below.

Monitoring

A qualified paleontologic monitor must be present to salvage specimens during ground disturbing activities 100 percent of the time in areas determined to have sensitivity which will be disturbed by a trencher or backhoe. Such monitoring must include contingency for backup monitors to assist in the removal of large or abundant fossils so that delays to construction excavation can be avoided. Monitors must be qualified and experienced in paleontologic salvage, authorized to temporarily divert equipment to remove fossils, and must be equipped with tools and supplies to allow rapid removal of specimens.

Some significant vertebrate paleontologic resources (such as rodents and insectivores) are small to microscopic in size. Their remains may not be readily apparent during construction excavation. Paleosols and fine-grained sedimentary horizons are likely to contain these fossils and must be sampled and tested by screen washing to determine if fossils are present. If the sediments are fossiliferous, bulk samples will be processed for recovery of resources. An adequate sample size shall be determined by the supervising paleontologist. Generally, a sample of 6,000 pounds of matrix for each horizon, paleosol, or stratigraphic bed within a sedimentary unit is considered to be adequate. The abundance or uniqueness of the recovered fossils may dictate salvage of larger amounts. To avoid construction delays, matrix samples may be removed from the path of excavation for processing on site or off site.

Specimen Preparation

Recovered specimens must be prepared to a point of identification (not exhibition) and stabilized for preservation. Fossiliferous matrix must be processed for recovery of contained fossils. Specimens must be identified and catalogued into the collections of an appropriate institution.

Specimen Storage

Arrangements for adequate storage of specimens recovered during monitoring must be provided. Adequate storage includes curation into the collections of a recognized paleontologic specimen repository with a permanent Curator, such as a museum or a university. Specimens must be stored in a fashion that allows retrieval by researchers in the future. Removal of excess matrix during the preparation and identification process will reduce storage space and, thus, storage costs.

Report Preparation

A report must be prepared by the paleontologist describing the significance of the specimens recovered, and discussing their relationship to the strata from which they were recovered and to other similar fossil localities. An inventory of specimens with numbers that correspond to the recording system used by the repository institution must be appended to the report of significance. The report will be prepared subsequent to salvage, preparation, identification, curation, and storage of the recovered resources.

Compliance

One copy of the report of findings and significance, including the specimen inventory, shall be filed with the lead planning agency for the project. Receipt of this report will indicate completion of the conditions of mitigation of impacts to paleontologic resources for the project. A second complete copy of the report shall be available at the repository institution.

CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

Environmental impacts are defined as modifications in the status of the environment, as it presently exists or was anticipated to be, brought about by an outside action. Impacts can be beneficial or adverse, and either short term or long term. Short-term impacts are defined as those changes to the environment during construction that would generally revert to preconstruction conditions at, or within a few years of, the end of construction. Long-term impacts are defined as changes made to the environment during construction and operation that would substantially remain for the life of the project or beyond.

This chapter identifies the potential impacts to environmental resources and describes mitigative measures that will be implemented, as appropriate, to reduce or avoid potential impacts. A summary of expected residual impacts, after mitigation, is provided at the end of this chapter.

EARTH RESOURCES

Potential Impacts

Erosion and Sedimentation

Potential erosion hazards present along the proposed cable route include soil erosion from surface sheetflow during heavy rains, wind erosion, headward erosion of gullies, and erosion in the form of scour at canyon, stream, and arroyo crossings. The potential for erosion is generally low along most of the proposed cable route due to the relatively low amount of rainfall, the sediment/soil types present, and the predominantly gentle slopes along the proposed route.

Erosion of soil or backfill overlying the cable may occur by surface sheetflow during or after rainfall. The amount of soil erosion will depend on the slope inclination, type of soil present, degree of compaction, and extent and type of vegetative cover.

Wind erosion may occur where there are unvegetated or unprotected soils. Wind erosion removes the silt and clay fraction from soil and could occur along portions of the route that are not revegetated or properly recompacted.

Gullying has occurred in many of the drainages along the cable route. Headward erosion of these gullies may continue and could expose and possibly damage the cable in the future.

The proposed cable route intersects a variety of surface water conveyances including canyons, streams, and arroyos. Potential impact at each of these locations is a function of many factors, including size of drainage, channel configuration, channel slope, type of flow, depth to bedrock, soil types, angle of intersection, and historic trends. Normal climatic conditions in the vicinity of the proposed cable route do not supply precipitation sufficient to provide perennial surface flows in most of the drainages.

Surface Fault Rupture

The potential for surface faulting along the cable route exists at locations where mapped Quaternary faults cross the proposed route (see Chapter 3). With the exception of the San Andreas Fault, which has typical recurrence intervals of 145 to 200 years (Sieh 1984), and the San Jacinto Fault, which has typical recurrence intervals of 190 years (Clark et al. 1972), the frequency of surface fault rupture along these faults is not known. However, based on evidence such as displaced contacts, geomorphic expression, tectonic setting, and historical seismicity, it is likely that earthquake recurrence intervals on these faults is on the order of thousands to tens of thousands of years. Therefore, the potential for surface fault rupture to occur at any of the fault crossings during the lifetime of the project is considered moderate to low.

Strong Ground Motion

Because the project area is near major active structures such as the San Andreas and Garlock faults, and is within the presence of Quaternary faults, the proposed cable and repeater stations will likely be subject to significant levels of strong ground motion within the project lifetime. The level of acceleration that can be expected at a given location depends on several factors, including distance to the earthquake source, magnitude of the event, subsurface soil conditions, and attenuation of ground motion with distance from the source. Because these factors are highly variable, levels of acceleration resulting from a given seismic event will vary considerably along the proposed route. However, based on the distribution of potentially active faults within and adjacent to the proposed route, it is apparent that both the likelihood and strength of seismically induced strong ground motions increases from east to west across the proposed cable route.

Potential impacts resulting from strong ground motion along the cable route include damage to the cable and/or repeater stations caused by lurching or ground failures on moderate to steep slopes, or structural damage to repeater stations caused by strong ground motion.

Liquefaction

Liquefaction occurs when loose, granular, saturated soils in the shallow subsurface are subjected to repeated cycles of strong ground motion. The potential for liquefaction is present in several areas in the western and central portions of the study area where shallow ground water underlies granular soils within and adjacent to the Mojave River. Although shallow ground water is likely present in the vicinity of playa lakes, these areas are commonly underlain by silts and clays that generally would not be subject to liquefaction.

Damage to repeater station structures could occur if stations were underlain by soils susceptible to liquefaction.

Slope Instability

Areas with potential serious slope instability problems, such as major known landslide terrains, have not been identified along the proposed cable route. Most of the route traverses areas with slopes less than five percent. Areas with the highest potential for slope instability consist mainly of exposures of weathered bedrock with relatively steep (greater than 10 to 15 percent) slopes and steep channel side-slopes. Potential impacts include damage to the cable or repeater stations.

Hydrocompaction (Soil Collapse)

Sediments susceptible to hydrocompaction are loose, low density, and open-textured soils that collapse upon wetting. Soils subject to hydrocompaction are typically found in young alluvial fan deposits above the zone of saturation, generally within a few hundred feet of the ground surface. Subsidence due to hydrocompaction could present a potential hazard to repeater stations underlain by susceptible soils. Subsidence related to hydrocompaction would not present a problem in areas between repeater stations.

Expansive Soils

In an arid environment, soils that contain expansive clay minerals will exhibit some shrink-swell potential. The amount of expansion-shrinkage is a function of confined stress, moisture content changes, and the percentage of the soil composed of expansive clay minerals. Soils containing expansive clay minerals, such as montmorillonite, are likely present near the playa lake beds and the distal portions of alluvial fans. Potential soil expansion impacts include damage to repeater station structures.

Hydrology

The cable will be attached to existing bridges where it crosses perennial streams and rivers. As described in Chapter 3, the majority of drainages in the study area are ephemeral and streamflow occurs only in direct response to rainfall. It is expected that most of these drainages will be at low flow or dry during construction. Should the cable be installed through flowing or standing water, short-term increases in turbidity and suspended sediments would occur. Such degradation would have mostly aesthetic impacts, and would not last much longer than the cable installation period. A significant increase in erosion along the cable route could also result in impacts to surface water.

As stated in Chapter 2, each repeater station will include a standby generator and an 80-gallon diesel fuel tank. Because these fuel tanks will be completely enclosed in dual-wall concrete, they do not pose a hazard to surface or ground water.

Mitigation

On the basis of available information, geologic and soil considerations are not expected to preclude construction in the proposed cable route. While portions of the route may be affected by potential geologic hazards, the potential hazards can be mitigated by proper design and construction methods.

To reduce the potential for damage caused by the potential geologic hazards previously identified, a geotechnical investigation including soil borings, sampling, and testing should be conducted to assess the presence/potential for expansive soils, liquefaction, and hydrocompaction and to develop geotechnical recommendations for project design specifications.

Special design considerations, such as engineered trench backfill and alignment of the route at angles to faults so as not to overextend cables, may be necessary at fault crossings to minimize impacts of surface fault rupture. The cable should be buried at sufficient depth so as not to be affected by future scour or erosion in drainages.

Repeater stations should be designed for ground accelerations that could be expected during the lifetime of the project. The precise location of the repeater station at Cajon Junction should be chosen so as not the overlie the San Andreas Fault zone. Other repeater stations should not be located on potentially active faults.

Areas along the proposed route with high to severe erosion potentials are subject to measurable increases in erosion due to project construction. However, these potential impacts can be minimized by implementing the following erosion control guidelines during construction:

1. Disturbed soils along the cable route will have contours restored to their pre-construction conditions.

2. US Sprint will complete all surface reclamation and erosion control procedures deemed necessary by the Authorized Officer Field Representative of BLM.

3. Where required, the cable route will be examined on a site-by-site basis by local BLM personnel and will be reclaimed or revegetated at the direction of local BLM specialists.

4. Top soil will be preserved in all areas requiring reseeding or revegetating.

5. During construction, soil disturbance will be minimized by prohibiting the storage of construction equipment and vehicular traffic outside the construction right-of-way.

6. Existing roads, washes or disturbed areas will be used for ingress to and egress from the right-of-way. Cross-country travel to access the construction site will be prohibited. When practical, construction crews will carpool to suitable parking sites along the right-of-way to the work site. Preconstruction route travel, surveying, staking, etc. will be minimized and will be coordinated with the BLM authorized officer to avoid unnecessary damages.

7. The right-of-way will be cleared only to the extent necessary to allow equipment passage, subject to the BLM authorized officer's approval.

8. In areas where the proposed cable route does not lie in an existing road or travel course, the right-of-way will be left in a manner which will not facilitate its becoming a travel route. Subject to approval by the BLM authorized officer, this will be accomplished by replacing rocks removed during construction, and by the manner in which recontouring is done.

9. All disturbed drainages will have contours restored to their pre-construction conditions. Riprap may be recommended to minimize stream bank erosion.

BIOLOGICAL RESOURCES

Potential Impacts

Potential adverse impacts of the proposed project on biological resources would only be associated with construction activities which would disturb habitat (soil and vegetation) along the corridor. Operation of the fiber optic cable would not involve new surface disturbances or activities that would result in off-site disturbance. The potential adverse effects of construction of the proposed project are described below.

As described earlier, the cable would require a permanent 10-foot-wide right-of-way, and an additional, temporary 10-foot-wide construction zone. Along all but several miles of the route, the corridor is located within 40 feet of the edge of existing paved or dirt roads. In addition to the cable, ten aboveground repeater stations will be established within the corridor, each requiring a 25-by-25-foot area of disturbance.

Installation of the cable would involve very little surface disturbance. In areas of flat or gentle terrain, the area of disturbance would consist of the vehicle tracks from equipment passage and a small (less than one foot wide) corridor of disturbance where the plow rips the soil for the cable. In areas of steep terrain or in areas with rocky substrate, a backhoe would be used, causing disturbances due to a small trench one to two feet in width and a side cast zone. Disturbed areas will be returned to pre-disturbance grade after installation of the cable.

Potential impacts of the project are expected to be negligible to minor in magnitude and non-significant for the following reasons:

1. Impacts would essentially be temporary, consisting of reversible disturbances to roadside soils and vegetation.

2. Roadside habitats are generally of low value (see Chapter 3).

3. Impacts would be highly localized in scope, and restricted to a narrow 20-foot-wide corridor.

4. Potential significant impacts to legally protected plants and animals can be avoided.

Botanical Resources

Vegetation Types

Impacts to vegetation would include crushing of roadside vegetation from construction equipment, and the removal of vegetation within the narrow plow line or trench corridor. Based on field surveys, it appears no trees are present in the corridor that would need to be removed. Vegetation that would be disturbed includes grasses, herbs, and various shrubs. Herbs and grasses are expected to naturally recolonize disturbed areas. However, many of the shrub species are expected to recolonize very slowly, or not at all, due to the poor revegetation potential of many dominant Mojave Desert shrubs. Despite this consideration, the magnitude and significance of potential impacts to native vegetation are expected to be only moderate because: (1) the area of disturbance would be very small and narrow; (2) most of the disturbance would involve crushing rather than removing plants, thereby retaining at least a small amount of revegetation potential; and (3) most of the corridor contains previously disturbed vegetation.

Legally Protected and Other Sensitive Species

Installation of the cable is not expected to disturb the Santa Ana River woolly-star plants along Baseline Road in Rialto because the plants are at least 50 feet from the edge of the road, well beyond the disturbance corridor. Appropriate mitigation measures can be implemented to ensure avoidance (see end of this section).

Several small woolly-star plants could be disturbed and removed along Cajon Boulevard south of Devore because they are located adjacent to the corridor. Based on a site visit and discussion with US Sprint engineers, these plants can be entirely avoided during installation by using carefully controlled excavation techniques. Additional measures can be implemented to ensure complete avoidance.

The four populations of bicolored penstemon in southern Nevada would be disturbed during installation of the cable. It is estimated that about 50 percent of the plants in these populations (about 50 plants) would be crushed or removed. This would only represent an impact of minor magnitude and significance because: (1) the roadside populations are not expected to be extirpated; (2) other populations of this species are present in scattered locations along the route in southern Nevada; (3) the species appears to readily colonize disturbed areas and could return after construction; and (4) this taxon is not a highly rare and/or vulnerable species.

As discussed in Chapter 3, it is possible that some of the other sensitive species listed in Table 3-4 could occur within or near the proposed corridor. However, potential impacts to these species would be negligible because their occurrences are expected to be very few and restricted. Mitigation measures to reduce potential impacts to all sensitive plant species are discussed in the Mitigation section of this chapter.

Species of Special Interest

The single Mojave indigo bush plant found near the corridor at the Mojave River crossing is not expected to be removed because it appears to be outside of the disturbance corridor. Inadvertant removal of this plant would be only a negligible impact because it is not a highly rare and/or vulnerable species. Potential impacts to other plant species of special interest are expected to be very rare and would represent negligible impacts to the species.

Sensitive Vegetation Types

A small amount of vegetation with elements of alluvial fan scrub may be disturbed along Baseline Road in Rialto. In addition, small areas of shadscale scrub would be disturbed near Valley Wells Station. These disturbances would represent negligible impacts because: (1) the former vegetation type has been previously disturbed (and represents only a very poor example of this type); and (2) the disturbances are small in areal extent and are reversible because plants in adjacent areas are expected to recolonize. There will be no disturbance within the Valley Wells shadescale scrub unusual plant assemblage because the flagged route is entirely inside a roadway.

The riparian woodland at the Mojave River crossing would not be disturbed because no riparian vegetation occurs along the corridor and the cable will be attached to the bridge over the river.

Wildlife Resources

Potential impacts to wildlife along the route consist of disturbance to habitat (i.e., soils and vegetation) and displacement of resident wildlife during construction. The former impact is not expected to be significant at any location because the corridor occurs in roadside habitats with low wildlife value due to clearing, grading, application of gravel, off-road traffic, refuse dumping, and adjacent noise/lights/vibrations from traffic. Displacement of wildlife would be temporary (i.e., several hours during a single day at any one location along the route). It is anticipated that the few expected resident animals in the corridor could adjust to this displacement without significant disruption.

Legally Protected and Other Sensitive Species

No Gila monsters are expected to be present within or near the corridor. Therefore, no impacts to this species are anticipated.

Tortoise may be encountered within the corridor where it traverses desert tortoise habitat. Due to the nature of roadside habitats, the overall number of tortoises within the corridor is expected to be low. As such, direct impacts to this species from the project as a whole are not expected to be significant. However, an undetermined number of tortoise could be lost due to vehicular traffic and equipment operation in the corridor during construction. Mitigation measures to reduce these impacts to a negligible level are listed in the Mitigation section of this chapter.

Mohave ground squirrels occur in habitats along the route between Adelanto and Helendale. This species is not expected to establish burrows in the corridor, but may use portions of the corridor for limited travel and foraging. The potential number of squirrels that could be displaced or disturbed by installation of the cable is expected to be very low because the animal is highly mobile and can avoid the disturbances, and because few (if any) squirrels are expected to reside within the corridor. Potential impacts to this species or any of its local populations are not expected to be significant because: (1) few animals are expected to be affected; (2) the disturbances will be highly localized and of only a few hours duration at any location; and (3) the quality of the habitat affected is low for the species. Meatures to reduce impacts to this species are discussed in the Mitigation section.

Installation of the proposed cable is not expected to adversely affect other sensitive species described in Chapter 3 because they are not likely to occur within or near the proposed corridor.

Sensitive Habitats

Although the proposed route will cross portions of the Mohave ground squirrel and desert tortoise range that support high densities of these species, the installation of the cable is not expected to adversely affect any local, high density population because the roadside corridor represents comparatively poor habitat for these species.

The proposed project would not disturb any riparian vegetation of the Mojave River crossing. In addition, cable installation would occur in the winter prior to the arrival of riparian breeding birds. As such, the proposed project would not adversely affect breeding birds in the Mojave River riparian habitat.

Cable installation would not adversely affect raptors or their nests due to the great distance from potential nesting habitat and the short term, localized nature of the habitat disturbance.

Mitigation

Recommended mitigation measures to avoid and minimize potential adverse effects on biological resources are described below:

1. To the extent practicable, rubber-tired construction vehicles should be used during cable installation.

2. Existing roads, washes or disturbed areas will be used for ingress to and egress from the corridor. Cross-country travel to access the construction site will be prohibited. To minimize travel and parking, crews will be assembled in as few vehicles as possible and drive to and from highways or other suitable parking sites along the corridor to these work sites. Preconstruction route travel, surveying and staking will be minimized and done in coordination with the BLM authorized officer to avoid unnecessary surface damage and impacts to sensitive species.

3. The corridor will not be cleared to bare earth during construction. The only clearing will be that necessary for equipment passage, subject to approval of the BLM authorized officer.

4. The width of the disturbance zone along the route should be minimized to the extent practical. Construction vehicles should be excluded from traveling or turning around in undisturbed areas outside the corridor (except where necessary for safety reasons).

5. Removal of any mesquite, desert willow, smoke tree, Joshua tree, or other large shrubs should be avoided whenever feasible. If it should be necessary to remove a large and valuable plant specimen, consideration will be given to marketing it or replanting in the corridor.

6. The populations of woolly-star plants along Baseline Road and Cajon Boulevard should be indicated on construction drawings and shown in the field to the construction foreman. The disturbance corridor should be located to avoid all nearby plants by at least 3 feet. Immediately prior to construction, the locations of the populations should be clearly

staked and flagged. During cable installation, all vehicles and workers should be excluded from these areas. A biological monitor familiar with the plant should be present to ensure avoidance. Flagging and stakes should be removed upon completion of construction activities in the area. The applicant will develop an avoidance plan with BLM and USFWS to comply with Section 7 requirements of the Endangered Species Act. At this time, it does not appear that a formal consultation will be required because complete avoidance of the plants appears feasible.

7. Two unnamed washes along the route on Baldy Mesa should be carefully examined prior to construction in these locations, to search for areas of potential habitat for Hemizonia mohavensis (Krantz 1987). This plant is presumed extinct, but these washes appear to be potential habitat. If potential habitat is identified, the cable can be relocated closer to the gravel road shoulder to completely avoid suitable habitat.

8. To prevent any unauthorized "taking" of the California endangered Mohave ground squirrel, the following should be implemented:

   A. Within potential Mohave ground squirrel habitat (from south of Adelanto to Helendale), all construction workers should be informed of the legal protection status of this species and the need to avoid adversely affecting it.

   B. Within potential habitat, all construction workers should observe a 20-mile-per-hour speed limit and be cautious to avoid squirrels when travelling off-road.

   C. Immediately prior to construction, a biological survey should be conducted along the corridor within potential habitat to search for Mohave ground squirrel burrows within or directly adjacent to the corridor. In the event an active burrow is encountered within the zone of potential disturbance, the route should be relocated to avoid the burrow, Or the animal should be trapped and temporarily relocated during construction. The latter action would require coordination with the California Department of Game and Fish, and a permit to trap the animal.

9. Pursuant to recent BLM policy, additional botanical investigations will be conducted to ensure avoidance of all federal candidate (Category 2) and BLM sensitive plant species within the corridor. To accommodate the project schedule, literature-based investigations and field surveys will be conducted in the winter of 1987-88 to eliminate portions of the corridor which are not likely to contain such species due to unsuitable site conditions or because they are outside the range of such species. In areas of uncertainty, additional field surveys will be conducted in early 1988 to determine if such species are present in the corridor. Avoidance measures will be implemented if the species are within an impact zone. If avoidance is not feasible, the applicant will consult

further with BLM. Results of all investigations and qualifications of investigators will be provided to BLM prior to authorization of construction.

10. In areas of medium to high density populations of desert tortoise, the applicant will implement the standard tortoise avoidance procedures during construction. These procedures are listed below. Prior to implementation, the applicant will seek approval by BLM of the areas to be surveyed for desert tortoise.

    A. The applicant will provide as many qualified biologists as necessary to adhere to the stipulations listed below. These biologists must be approved by BLM.

    B. If construction of the cable occurs during the tortoise hibernation season which is from approximately November 15 through February 28, the following stipulations will be adhered to:

        i. In Nevada, the applicant will obtain a permit from the Nevada Department of Wildlife (NDOW) for the purpose of handling wild desert tortoises. The applicant will consult with BLM to determine if a similar permit is required for California.

        ii. No surface disturbing activities or construction will take place until the following is completed:

            a. The applicant will stake the centerline of the cable and the route that vehicles will travel. These areas will be surveyed for desert tortoise and desert tortoise sign by qualified biologists.

            b. The route will divert around desert tortoise burrows where feasible. All hibernating desert tortoise that may be harmed as a result of these surface disturbing activities will be excavated and collected by qualified biologists. In Nevada, all collected tortoises will be transported to NDOW Region III headquarters at 4747 W. Vegas Drive, Las Vegas, Nevada. The NDOW will also be provided with the legal description of where the tortoises were excavated from. Similar procedures for California will be developed with BLM.

            c. The biologists will provide all construction personnel with an orientation and an information pamphlet (provided by BLM) that discusses the biology of the desert tortoise, potential hazards to tortoises from construction activities, how each construction worker can help to prevent direct and indirect harm to tortoises, the legal status of the tortoise, local adoption as alternative to poaching, and how to handle an injured tortoise.

C. If construction cannot be confined to November 15 through February 28, the following stipulations will be adhered to for the protection of active tortoises (construction March 1 through November 15, approximate active above ground season):

   i. Applicant will obtain a permit from NDOW for the purpose of handling wildlife desert tortoises (and a similar permit if required in California).

   ii. During construction, trained personnel will conduct continuous patrols of access roads and along the construction route for signs of desert tortoise. All live tortoises found during the patrols will be relocated at least 100 yards away from any construction activities. The applicant will provide enough qualified biologists to be present during construction to train and supervise personnel to perform these activities.

   iii. The biologists will provide all construction personnel with an orientation and an information pamphlet (provided by BLM) that discusses the biology of the desert tortoise, potential hazards to tortoises from construction activities, how each construction worker can help to prevent direct and indirect harm to tortoises, the legal status of the tortoise, local adoption as alternative to poaching, and how to handle an injuried tortoise.

11. Upon project completion, the applicant will provide monetary compensation for unmitigated impacts to the desert tortoise. The amount will be determined by BLM in consultation with CDFG and NDOW, the Desert Tortoise Council, and the applicant. The funds will be reasonable and fair, and commensurate with the actual unmitigated impacts.

LAND USE

Potential Impacts

The assessment of impacts for land use focused on existing, planned and future land uses along the proposed fiber optic cable route. Documents from appropriate federal, county and local governmental jurisdictions were reviewed, and representatives of such agencies were contacted to identify potential land use changes which might result due to the project.

Because the permanent 10-foot cable right-of-way will be located within existing roadway or utility rights-of-way, and the cable will be buried to a minimum depth of 42 inches below ground, the project would create no significant land use impacts. In general, only temporary impacts would result during construction where a 20-foot construction right-of-way would be reserved, and those impacts would be minimal due to the rapid method of construction. Existing buried cables or pipelines would be located prior to trenching to prevent their being severed. Impacts associated with construction would include temporary delays to traffic flow, particularly along the city street portions of the route and at bridge crossings.

No significant proposed or planned developments were identified which would be affected as a consequence of the cable route. In addition, no conflicts with the BLM or USFS plans have been identified, as long as certain guidelines are followed.

In California, much of the proposed US Sprint fiber optic cable would be located on BLM property. These lands are administered by the California Desert District. The BLM CDCA Final Environmental Impact Statement and Proposed Plan recognizes the importance of utility crossings over public land: "The Proposed Plan provides opportunities for a full range of energy production and transmission facilities in the CDCA and would have an overall positive impact." Furthermore, "It is intended by identifying corridors in the Proposed Plan subsequent planning, engineering and review time frames and expenses will be substantially reduced."

The proposed route follows the joint-use utility corridor through the CDCA, with the exception of approximately 4.2 miles, west of Cronese Valley. In this area, the proposed route would follow Interstate 15, up to 0.8 mile north of the corridor boundary. The intent of the CDCA planning corridor designation is to consolidate utility facilities. Impacts resulting from the proposed cable route would be potentially lower along the existing Interstate highway, than within the prescribed corridor boundary, as the alignment would parallel a previously disturbed right-of-way.

As noted, the proposed route would cross San Bernardino National Forest. Since an existing communication cable conduit will be utilized, no new land disturbance will result from the installation of this cable. Repeater Station #1 (Devore) will be located on private land within San Bernardino National Forest boundaries.

George Air Force Base is located adjacent to a portion of the cable route. No conflict with George Air Force Base Installation Compatible Use Zone Study (1983) would be expected to result from either the installation of the cable or of a repeater station.

There are several unpatented mining claims on BLM land north of Yermo, in the vicinity of the proposed fiber optic cable route. The proposed right-of-way is, therefore, subject to prior existing rights.

As proposed, the US Sprint fiber optic cable would parallel approximately 7.5 miles of the route currently used during the annual Barstow to Las Vegas off-road motorcycle race. This route is located in the Cronese Lake area.

The proposed cable route between Rialto, California and the Nevada border does not cross or parallel any officially designated California State Scenic Highways. The route does, however, cross or parallel several eligible state scenic highways, as well as an official San Bernardino County Scenic Highway. The route crosses California 138 in San Bernardino National Forest, which is an eligible state scenic highway. Further north, the route parallels California 58, north of Barstow. This too is an eligible state scenic highway. Finally, the proposed cable route parallels Interstate 15, from east of Barstow to Baker. Interstate 15 is an officially designated county scenic highway, and an eligible state scenic highway.

The repeater station sites would be located on vacant lands adjacent to existing roads, so that access during construction and occasional maintenance would not conflict with adjacent uses in the vicinity of those sites.

Where the proposed route is located adjacent to areas designated for park, preservation or recreation use, the alignment will be within existing highway, railroad or utility rights-of-way and, therefore, will not adversely affect land use in those areas. Specifically, those areas are:

1. Soda Mountain WSA (California) - The proposed alignment will be sited just south of WSA 242, and will not affect the WSA.

2. East Mojave National Scenic Area (California) - The proposed cable route would pass through approximately 10 miles of the National Scenic Area. The proposed cable will be buried within existing rights-of-way and no significant impacts are expected to result from its location.

3. Hollow Hills WSA (California) - WSA 228 lies very near the proposed fiber optic cable route northeast of Baker. No significant land use impacts to the WSA are expected to result from this alignment.

4. Halloran Wash ACEC (California) - The proposed cable route would pass through the ACEC at its southern edge. The area is designated as an ACEC because of prehistoric values. While no significant land use impacts are expected, cultural resources may be affected.

5. Cronese ACEC (California) - The proposed cable route would cross approximately 0.5 mile of the southern edge of this ACEC. While no significant land use impacts are expected, cultural resources may be affected.

The proposed action will not affect any Wilderness Area or Wilderness Study Area. With regard to planned or future land use, this assessment indicates that no significant impacts would result from the proposed cable installation. While construction of repeater stations would preclude any other uses directly on those sites, adjacent future land use would not be affected.

Mitigation

Due to the existence of several unpatented mining claims on public land in the Lead Mountain area, US Sprint will identify and notify all claimants impacted by the cable route. The applicant will notify the (mining) claimants to determine if there is a potential that construction and operation of the cable might interfere with mining operations.

To avoid conflicts between cable installation and the Barstow to Las Vegas motorcycle race, several mitigation steps should be taken:

1. No construction or maintenance activities should occur along the right-of-way from T12N, R5E, Section 36 to T12N, R7E, Section 30 on those dates scheduled for the race.

2. No equipment or materials should be present along the right-of-way section mentioned above on those dates scheduled for the motorcycle race.

The race is usually held during the Thanksgiving holiday weekend. Therefore, construction will not interfere with the race (January to May, 1988).

As noted, BLM will require a conduit system for the fiber optic cable in the area near Mountain Pass. This system is being required due to both the sensitive nature of the area and in recognition of the potential for future communication cable siting requests. The conduit will be 7.2 miles long, from the Nipton-Interstate 15 interchange west to Section 14, T16N, R13E. The proposed western terminus of the conduit is predicated on Molycorp allowing the conduit to cross its property (Section 31, T16N, R14E, and Section 13, T16N, R13E). If permission is not obtained from Molycorp, the western terminus of the conduit will be at the BLM-Molycorp property line (Section 31, T16N, R14E).

If the water pipeline in T16N, R12E, Section 28 must be broken to lay the cable, the grazing lessee will be given three days prior notice. The pipeline will be repaired the same day it is cut.

Employees will not stop or store equipment within 200 yards of livestock water.

The proposed fiber optic cable route would be located within road or utility rights-of-way. It should be noted that efforts can be made to minimize the intrusive construction and site disturbance associated with installation of fiber optic cable. Within the right-of-way, it would be preferable that the cable be buried in that part of the right-of-way that has been previously disturbed by other infrastructure development.

VISUAL RESOURCES

Potential Impacts

Cable Route

The buried cable could adversely affect visually sensitive areas by causing visual contrasts. Visual contrast could occur if dense vegetation were cleared, or if exposed soil color contrasts with undisturbed soils. Soil disturbance causing extensive erosion could expose contrasting soils and prevent revegetation. Because revegetation potential is low in desert environments, permanent vegetation removal in steeply sloped areas can cause visual impacts. Specific areas of concern for adverse visual impacts include the crossings of arroyos and streams because of the characteristic features of high vegetation densities, steep banks and bluffs, and hilly terrain. Finally, the proposed galvanized steel posts and brightly colored warning signs, placed every 1,000 to 1,200 feet along the cable route, could be contrasting visual distractions in sensitive view areas. Short-term visual impacts could result from temporary vegetation removal, erosion, and construction equipment in sensitive areas. Dust from construction activities could also present a short-term aesthetic impact.

California

No major adverse visual impacts are expected to result from the proposed cable route in California, due to low visibility and contrast of the project. The route follows highway, railroad and utility rights-of-way that have been previously disturbed. Consequently, vegetation removal and soil color contrasts should be weak. However, there is some potential for adverse impacts in areas with steep gradients and highly erodible soils, where erosion could cause stronger visual contrast. This situation could occur in the rolling terrain located in the Mitchell Range where ground disturbance will be more evident due to low vegetation density, soil color contrasts, and high erosion potential. Similar conditions exist in other landscapes with rolling terrain, such as Mountain Pass. However, because these landscapes have already been modified by mining, dirt road construction and transmission line corridors, additional visual contrast, although visible, would not be considered strong.

Other visual contrast impacts may result if revegetation is unsuccessful or if dense vegetation is removed. Specifically, this could occur along the Mojave River near Silver Lakes, if dense riparian vegetation were removed, and on Baldy Mesa, where dense chaparral vegetation may have to be cleared. Much of the remaining route has low revegetation potential because of low rainfall and sandy soils characteristic of the Mojave Desert. However, because vegetation density tends to be low, minimal vegetation will be removed during construction.

Impacts to sensitive viewers are predicted to be low. The route passes adjacent to residences in areas that have been previously disturbed. Many of the roads and highways paralleled are also adjacent to transmission line corridors, or underground pipeline and telephone cables, and will show little change after cable installation. Of specific concern are potential impacts to the East Mojave National Scenic Area, which is crossed near Mohawk Hill on the north side of Interstate 15. Impacts are not expected to be adverse because existing modifications in the vicinity, including dirt roads and transmission lines, reduce potential visual contrasts from the project.

The project should conform with the BLM VRM classes for applicable areas, especially for landscapes managed as VRM Class III and IV. In landscapes classified as VRM Class II, care should be taken to effect low level changes. This can be accomplished by avoiding the clearing of dense vegetation, and by burying the cable in areas with existing disturbance or where disturbance will be screened from sensitive viewers.

Nevada

Visual impacts from the cable will be low through Nevada due to the weak contrast of the proposed project. The majority of the alignment is located in previously disturbed or modified street or road rights-of-way through urban areas, or within flat, minimally vegetated desert terrain. Consequently, minimal additional disturbance is expected in urban areas, and vegetation removal is expected to be minor.

Repeater Station Sites

Potential adverse visual impacts from the repeater stations result from several factors: building visibility; viewer sensitivity and viewing duration; distance from viewpoint; and dominance or contrast of the buildings or fencing with the surrounding landscape. Impacts will occur if the building scale dominates the setting, or if building or fence texture or color cause high visual contrasts. The greatest visual impacts could occur in areas visible from sensitive viewpoints. Examples of these, based on viewer sensitivity and viewing duration, are views from a major scenic highway or scenic areas.

Assuming aggregate-surface building walls and natural colors, most of the repeater stations will have low visual impacts due to the small physical size and weak contrast of the buildings. Potential contrasts from visibility of the standby generator are effectively screened by placement in a building identical to the repeater hut. Most of the repeaters are located in areas with few sensitive viewpoints. Sites where greater visual impacts could occur are those visible to high sensitivity viewpoints with prolonged views such as residences, or those lacking existing modifications or structures in the vicinity. Table 4-1 summarizes the impact levels at specific repeater sites.

Mitigation

Cable Route

Potential visual impacts will be reduced primarily by mitigation measures to decrease project contrast. In areas where the cable will cross streams, arroyos or other landscapes with high vegetation densities, vegetative clearing should be minimized and revegetating techniques applied where necessary. Erosion control measures should be implemented in areas with steep bluffs or hilly terrain to minimize scarring and other visual contrasts. Refer to the Earth Resources section for specific erosion control guidelines. Finally, warning sign posts in sensitive areas should be painted brown, or another suitable earth-tone color, to reduce the visual contrast with the surrounding landscape. Landscapes where this should be applied include the cable route in or adjacent to the East Mojave National Scenic Area and Soda Mountain WSA; when paralleling eligible or designated scenic highways; and when in close proximity to residences.

The requirement for a conduit system in the Mountain Pass area will reduce potential for future ground disturbance in the East Mojave National Scenic Area.

Repeater Station Sites

Potential adverse impacts can be reduced by mitigation measures to decrease project visibility and contrast. For all sites, vegetation clearance and site disturbance should be minimized to reduce visual contrasts with the surrounding landscape. Existing natural vegetation and terrain should be used to screen the structures from residences, roadways, and other sensitive viewpoints. In addition, indigenous vegetation should be planted to provide additional screening of the structures and fencing if adjacent to particularly sensitive viewers. For all locations, natural-color aggregate building walls, with door and trim painted to match, are assumed. Table 4-1 summarizes initial impact levels and recommended mitigation measures for the repeater station sites.

SOCIOECONOMICS

Potential socioeconomic impacts from the proposed project may occur during the construction or operation phases. Due to the nature of construction and operating procedures, however, no adverse socioeconomic impacts would be generated during the life of the project. A beneficial impact would be generated in the two counties due to payment of property tax revenues.

During cable installation, several construction crews would operate simultaneously at dispersed locations. Each crew would consist of up to 10 skilled professionals, most of whom would be recruited from outside of the local area. Installation of the cable would proceed at an average rate of four to seven

TABLE 4-1
VISUAL IMPACTS AND RECOMMENDED MITIGATION FOR REPEATER STATIONS

Repeater Station Number/Name	Impact Level	Existing Environment	Recommended Mitigation*	Comments
California				
#1 - Devore	Low	Railroad structures nearby; I-15 superior viewing position.	1, 4, 6	Match colors of existing structures.
#2 - Highway 395	Low	Existing commercial structures; variety of building materials; residence screened by vegetation.	4, 6	Match colors of existing structures.
#3 - Rodeo Road	Low	Existing structures nearby; some backdrop and some views on skyline to National Trails Highway.	1, 2, 6	Relocate to south for more effective backdrop and to setback from National Trails Highway and Rodeo Road.
#4 - Irwin Road	Low	Some open views from resicences; adjacent to California 58; site is a vacant lot between residences.	3, 4, 5, 6	Match colors of existing structures, use vegetation for screening, match fencing to easily access power source.
#5 - Yermo Road	Low	Visible from I-15 county scenic route and state eligible scenic highway in the foreground; abandoned structures nearby residences 0.5 mile away.	1, 5, 6	Underground power to avoid crossing of Yermo Road.

* **Mitigation Measures**

1. Minimize vegetation clearing and site disturbance. Revegetate when needed.
2. Relocate structure to take advantage of nearby vegetation or landforms for screening.
3. Plant indigenous vegetation to screen the structure.
4. Paint, stain or otherwise color structure to complement its surroundings (an aggregate surface is assumed).
5. Underground power line to repeater site.
6. Use nonspecular fencing material or match fencing material found in area.

Table 4-1 (continued)
Visual Impacts and Recommended Mitigation for Repeater Stations

Repeater Station Number/Name	Impact Level	Existing Environment	Recommended Mitigation*	Comments
#6 - Afton Crossing	Low-Mod	Skyline views from I-15, a county scenic route and state eligible scenic highway; WSA adjacent; existing structures in vicinity; VRM Class IV.	1, 3, 4, 5, 6	Screen from I-15 with creosotebush.
#7 - Baker	Low	No existing structures; East Mojave National Scenic Area to south; VRM Class II; levee and hills provide some backdrop.	1, 2, 4, 5, 6	Move behind levee to screen from I-15 and East Mojave National Scenic Area.
#8 - Halloran Summit	Low-Mod	Skyline views from I-15; power source located on opposite side of I-15; half-constructed home nearby.	1, 2, 5, 6	Relocate further north, downslope to screen from I-15.
#9 - Nipton Road	Low-Mod	No structures nearby; VRM Class II; distant mountains and surrounding hills backdrop; not visible to East Mojave National Scenic Area to south; visible to recreational users enroute to scenic area; no nearby power source, existing site disturbance.	1, 2, 5, 6	Move structure further downslope to take advantage of backdrop, revegetate existing disturbance.
#10 - Jean	Low	Existing structures nearby; site previously disturbed; adjacent to California 911; visible from I-15.	1, 6	Use nonspecular fencing material to reduce contrast and visibility to I-15.

miles per day. Crews will thus be present in any one area for a very short time. Worker transport to and from the work site would be provided by the construction contractor.

Due to the small, transitory nature of construction, no significant socioeconomic impacts would be generated. Growth-inducing impacts resulting from installation of the cable would not be discernible, due to the small scale of the project.

Once installed, the cable would have no direct socioeconomic impacts on adjacent communities. The project would not create new jobs, and would place no demands on local housing or public services. Repeater stations would be unmanned, and maintenance for the cable and repeater stations would be performed very infrequently by small crews dispatched from central offices of the operator. Growth-inducing impacts of the installed cable would be negligible due to the small scale of the project and lack of any permanent work force.

The impact of the US Sprint fiber optic system on the cost of telephone service would be negligible or slightly beneficial, if it resulted in a reduction of long distance rates through competition. However, this impact, should it occur, would affect customers on a regional or national scale.

Beneficial fiscal impacts would be generated for the two counties passed through by the cable route, through the payment of property taxes. These impacts are estimated for each county in Table 4-2. Actual taxes paid may vary substantially from these figures, due to changes in tax rates or assessment procedures prior to operation, and a determination of the specific tax districts which will apply. The State of California makes a yearly assessment of the value of the cable and the right-of-way, based on the value of the firm (US Sprint). The State of Nevada's estimate of the assessed value for the first year would be approximately 35 percent of the value (construction cost) of the fiber optic line system; in subsequent years, the assessed value would be approximately 70 to 80 percent of the value of the system, depreciated (Dicianno 1987).

The fiscal impacts estimated in Table 4-2 are beneficial, but negligible for both counties. Payment of approximately $366,569 to San Bernardino County, California would represent less than a 0.1 percent increase over the 1986 to 1987 property tax base. Likewise, payment of approximately $19,013 to Clark County, Nevada would represent less than a 0.1 percent increase over the 1986 to 1987 property tax base.

CULTURAL RESOURCES

Potential Impacts

Cable installation may adversely affect cultural resources in two ways: (1) direct impacts that result from the physical process of trenching or plowing; and (2) indirect impacts, usually viewed as impacts that result from increased traffic, visiting a site area during construction, and increased site vandalism. Direct impacts will be restricted to the 20-foot-wide construction right-of-way but in most cases will be confined to a much narrower corridor. While obviously difficult to measure or predict, for purposes of this project, the indirect impact zone has been defined to extend about 100 feet from either side of the centerline of the right-of-way. The cable installation process is not seen as a threat to: (1) standing historic structures along the right-of-way; (2) surface materials beyond the 100-foot indirect impact corridor; (3) subsurface materials beyond the 20-foot direct impact corridor; or (4) cultural materials not deemed significant (generally using criterion (d) 36 CFR 63, potential to yield scientific data). Additionally, significant cultural remains greater than 100 feet from the right-of-way may be vulnerable to indirect impacts and will be addressed on an ad hoc basis.

The fiber optic cable will be buried using three principal techniques. The most common technique involves tandem "plowing" which uses a shank mounted on a bulldozer that will simply slit the soil to a depth of 42 inches. A second bulldozer equipped with a similar shank and a cable feeding mechanism will follow closely behind. The second technique involves simple trenching to excavate a trench in urban areas and locations where the terrain is too irregular for the bulldozer and plow. The third technique, primarily employed in urban areas, involves use of a backhoe to excavate a 12- to 18-inch wide trench in which the cable will be buried, usually in a conduit and often encased in concrete.

The effect of the cable plow installation technique on most archaeological sites is minimal. Installation of the cable using a backhoe, however, would result in some destruction of subsurface cultural deposits. No matter which technique is used, all direct impacts to site surfaces are expected to be limited to the 20-foot-wide corridor and indirect impacts to 100 feet. No new access will be developed and, as a result, indirect impacts are also expected to be minimal.

As with prehistoric and historic sites, the archaeological survey crew field-checked previously recorded ethnohistoric sites. The cable route and repeater station sites were also surveyed. Specific testing and mitigation recommendations are included in the Technical Report (Woods et al. 1987).

Mitigation

Resource inventory strategies were developed in consultation with BLM and SHPO representatives in both California and Nevada. Similar procedures will be followed in developing mitigation strategies. This process has already been initiated and the feedback obtained is incorporated in the generic mitigation recommendations provided below. Site-specific mitigation has been developed and is included in the Technical Report (Woods et al. 1987).

TABLE 4-2
ESTIMATED PROPERTY TAX REVENUE
BY COUNTY (FIRST YEAR)

State	County	Cable Length (miles)	Full Value[a]	Estimated Assessed Value[b]	Percentage Estimated Tax Rate[c]	Estimated Project-Generated Property Taxes	Percentage of 1985-1986 Tax Levies
California	San Bernardino	198	$14,358,762	$ 32,155,200	1.14	$ 366,569	less than 0.1
Nevada	Clark	33	$ 2,393,127	$ 837,594	2.27	$ 19,013	less than 0.1

a Value based on a total project value (including construction of cable, repeater stations and any right-of-way aquisition) pro-rated to a per-mile value of $72,519.

b Assessed value estimates were determined by:
California: $162,400 per mile, based on California Unitary Tax Laws (Martin 1987).
Nevada: 35 percent of the new cost (here, Full Value) for first year only (Dicianno 1987).

c Tax rate estiamtes are average percentage of assessed value for all jurisdictions within a county. Sources are:
San Bernardino County: California State Board of Equalization, 1985-86. Annual Report.
Nevada County: Adair, A. 1987. Clark County Assessors Office, Nevada.

Since cultural resources are non-renewable, some adverse impacts are anticipated. Impacts to standing structures and other surface remains are expected. Subsurface prehistoric and ethnohistoric sites may be encountered, however, as well as archaeological deposits associated with historic buildings and activities. The following generic mitigation recommendations are directed toward minimizing such impacts:

1. Where feasible, the cable route should be modified to avoid known archaeological and historic sites. It will be difficult to avoid crossing archaeological and historic sites when installing the fiber optic cable because of the strategy of using existing road rights-of-way. If possible, however, it is recommended that the cable route be redesigned to avoid recorded cultural resources.

2. If avoidance is not feasible, a cable plow should be used (instead of a trencher or backhoe) to install the cable across known archaeological and historic sites if possible. This method will result in significantly less disturbance to subsurface cultural deposits.

3. Installation of the cable through known prehistoric and historic sites should be monitored by an archaeologist where simple trenching or a backhoe is used. Because important cultural remains (such as human burials, roasting pits or diagnostic artifacts) may be encountered even as a result of minimal ground disturbance, an archaeologist should be on hand to monitor cable installation through known sites. Monitoring is important not only at prehistoric sites, but also where the cable route passes in proximity to historic buildings. Because most of the historic sites are in urban areas, the cable will presumably be installed by backhoe excavations. This technique may destroy subsurface cultural deposits associated with historic occupation. An archaeologist should monitor the excavation to ensure that significant historic deposits are not inadvertently destroyed. Monitoring would involve employing a single archaeologist who would observe the backdirt and trench walls and collect any artifacts exposed during the excavations. Cultural features encountered during the excavations would be recorded with profile drawings and/or photographs.

4. If a trencher or backhoe is to be used or the method of trenching cannot be predetermined well in advance of construction, a testing program should be conducted. Limited testing prior to cable installation is recommended at sites where a trencher or backhoe is to be used because this equipment may destroy up to a half-meter-wide section across a site. Sites which have not been previously tested should be assessed for significance and distribution within the right-of-way.

   Data gathered in this manner could document that additional important information is recoverable from intact features and deposits at some sites, indicating that they may be eligible for listing on the National Register of Historic Places. The recommended work at such sites includes: (1) collecting artifacts exposed on the surface; (2) excavating auger holes and/or test pits to determine the presence of subsurface cultural deposits; (3) profiling of any subsurface cultural deposits encountered; and (4) documenting the fieldwork through field records, maps and photographs.

Tribal leaders should be consulted in development of mitigative measures for prehistoric and ethnohistoric sites for which Native Americans have expressed concerns. If requested, knowledgeable tribal monitors should be employed during survey, testing, data excavation and construction on Indian lands and in areas identified as ethnographically sensitive on former tribal lands.

PALEONTOLOGIC RESOURCES

Potential Impacts

The proposed cable route will cross numerous fossil-bearing strata between Rialto and Las Vegas. However, the only route sections likely to produce significant nonrenewable paleontologic resources are the fossiliferous sediments in the Harvard, Barstow/Yermo, Midway, Cronese-Soda Mountains, Valley Wells, and Ivanpah Valley sections. Furthermore, impacts are anticipated only where trenching or backhoeing will be used as the method of construction. Use of a cable plow is not considered a threat to significant nonrenewable paleontologic resources.

Mitigation

Where the trencher or backhoe is used in the five route sections listed above, mitigation procedures are recommended to preserve and salvage significant paleontologic resources. Recommended mitigation includes a preconstruction survey to define limits of the right-of-way that require monitoring; monitoring those areas during construction; salvaging fossils, where appropriate; cataloguing and storing collections; and preparing a report on the findings and their significance.

SUMMARY OF RESIDUAL EFFECTS

Expected residual impacts of the proposed project are summarized below, and are based on the following:

- Implementation of mitigation measures described in the previous section, as appropriate.
- Commitment by US Sprint to have a project manager and/or other company representative present during construction.

- Commitment by US Sprint to coordinate and consult with all permitting agencies, as appropriate, prior to and during construction.

Earth Resources

Increases in soil erosion will generally be minimal, except in areas with soils having high to severe erosion potential. Throughout these areas, the level of impact will vary. Along the proposed route, there are areas that have recently been disturbed and areas that have been covered by roadway materials or other urban development. Soil erosion increases in these areas are not expected. In less disturbed areas, adverse impacts will be lessened by the proposed constuction methods and erosion control procedures. These procedures are expected to minimize the amount and duration of erosion impacts. Significant long-term impacts to soils are not anticipated, provided the recommended construction methods and erosion control guidelines are implemented, as appropriate.

No long-term impacts to water resources are expected. If the cable is installed in flowing or standing water, short-term degradation would result from increased turbidity.

Proper design and construction techniques will reduce the potential for cable or repeater station damage from seismic events and geologic hazards.

Biological Resources

Potential impacts on sensitive biological resources were minimized by locating the proposed cable route in existing rights-of-way. The majority of the proposed route has been altered by past construction and maintenance activities. Sensitive plants, animals and habitats do occur in some areas crossed by the route; however, the project would not result in significant adverse impacts to unique vegetation communities, important wildlife habitat, aquatic habitats, or threatened or endangered species. These resources will be protected by implementing the mitigation measures previously described.

Land Use

The project will cause little significant conflict with existing or future land uses. Where the cable traverses park, recreation or preservation lands, it will be buried within existing road or utility rights-of-way. The cable will not cross any Wilderness Study Areas or Wilderness Areas. By using existing transportation and utility corridors, the project will conform with applicable agency plans and policies. Repeater stations will preclude other land uses on those sites. This constitutes a long-term impact, however minor in extent.

The proposed action will have very limited effects on the long-term productivity of the lands crossed. The cable will be installed in existing rights-of-way previously dedicated to such use. The repeater stations will preclude productivity at each site for the life of the project. The total amount of land from Rialto to Las Vegas taken out of productivity for repeater stations will be approximately 0.5 acre.

Visual Resources

Visual impacts from cable installation along the majority of the route will be low. Impacts may be low-moderate in isolated areas of rugged terrain or arroyo crossings. The removal of vegetation and exposure of contrasting soils would be contributing factors to these impacts. Soil erosion measures and revegetation techniques will limit the extent and duration of these impacts. Minor impacts are expected to users of East Mojave National Scenic Area. Although crossing through this sensitive area, the route is located where there has been previous ground disturbance.

Residual visual impacts will be low for the majority of repeater stations. This is due primarily to site location near other structures, which will weaken overall project contrasts. Residual impacts will be somewhat higher for sites located in areas lacking existing structures. At these locations, impacts would be low-moderate with implementation of the recommended mitigation measures.

Specifically, the use of nonspecular fencing will decrease visibility of the repeater from some viewing orientations under certain lighting conditions. This is especially important for the repeaters at Rodeo Road, Afton Crossing, Halloran Summit, and Nipton Road. In addition, where it is not possible to locate repeater sites immediately adjacent to a power source, undergrounding the power line is recommended. This will help reduce the degree of visual change in the area.

Socioeconomics

No adverse socioeconomic impacts will result from construction or operation of the proposed project. Tax revenues generated in the affected counties will be a slightly beneficial impact.

Cultural Resources

Four prehistoric cultural resources were found to be potentially affected. Avoidance, subsurface evaluation, data recovery, and monitoring were recommended where appropriate to reduce impacts to cultural values and avoid loss of significant scientific data (see Woods et al. 1987).

Paleontologic Resources

Applying the proposed mitigative measures to preserve and salvage significant nonrenewable paleontologic resources will reduce impacts to an acceptable level. Beneficial effects may be anticipated through the opportunity provided to professional paleontologists to advance their scientific knowledge of paleontologic resources in the areas studied.

CHAPTER 5 - AGENCIES AND PERSONS CONSULTED

The agencies and individuals contacted during preparation of the Environmental Assessment are listed below. In addition to these contacts, the bibliography in Appendix B provides further information sources.

The contacts noted in this section were for the purpose of data verification, discussion of specific impacts and mitigation, and/or consultation as required by various state and federal regulations. This input helped define the issues addressed in this document.

NATURAL AND HUMAN ENVIRONMENTS

California

- California Division of Mines and Geology
- City of Adelanto
- City of Barstow
- City of Rialto
- City of San Bernardino
- County of San Bernardino
    - Transportation Department
    - Land Management Department
- USDA Forest Service
    - San Bernardino National Forest
- USDI Bureau of Land Management
    - California Desert District
    - Barstow Resource Area Office
    - Needles Resource Area Office
- USDI Fish and Wildlife Service
    - Laguna Nigel Field Office

Nevada

- City of Las Vegas
- County of Clark
- Nevada Bureau of Mines and Geology
- USDI Bureau of Land Management
    - Las Vegas District Office
- University of Nevada, Reno

CULTURAL ENVIRONMENT

California

Agencies

Bureau of Land Management
- California State Office
  - Bob Laidlaw, State Anthropologist
- Riverside District Office
  - Garth Portillo, District Archaeologist
- Barstow Resource Area
  - Pat Barker
- Needles Resource Area
  - George Mackfessel

State Office of Historic Preservation, Sacramento
- Kathryn Gualtieri, SHPO
- Dwight Dutschke, Native American Coordinator

Native American Heritage Commission
- Executive Secretary
- Staff

San Bernardino County
- Land Management Department
  - Michael Lerch, Archaeologist

Native Americans

Colorado River Indian Tribes
- Anthony Drennan, Sr., Chairperson
- Charles Lamb, Museum Director

Fort Mojave Tribal Council
- Nora Garcia, Chairperson

Chemehuevi Indian Reservation
- Richard Alvarez, Chairperson
- Donald Smith, Member
- Tito Smith, Member

San Manuel Band of Mission Indians
- Henry Duro, Chairperson

Gabrielino Representatives
- Beatrice Alva
- Fred (Sparky) Morales

Kawaiisu Representatives
Andy (Cactus Eye) Green

Nevada

Agencies

Bureau of Land Management
Nevada State Office
Linda Armendtrout, Archaeologist
Las Vegas District Office
Ben F. Collins, District Manager
Stan Rolf, Archaeologist
State Line Resource Area
Keith Myhrer, Archaeologist

State Office of Historic Preservation
Alice Becker, Archaeologist

Native Americans

Las Vegas Paiute Tribal Council
Linda Romo, Chairperson

Moapa Paiute Tribal Council
Eugene Tom, Chairperson

Las Vegas Indian Center
Richard Arnold, Director

APPENDIX A

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LIST OF PREPARERS AND CONTRIBUTORS

The following prepared or contributed to the preparation of this document. Academic degrees are noted for principal investigators in each resource area.

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R.E. Reynolds PhD, Geology	Paleontology

APPENDIX B

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REFERENCES

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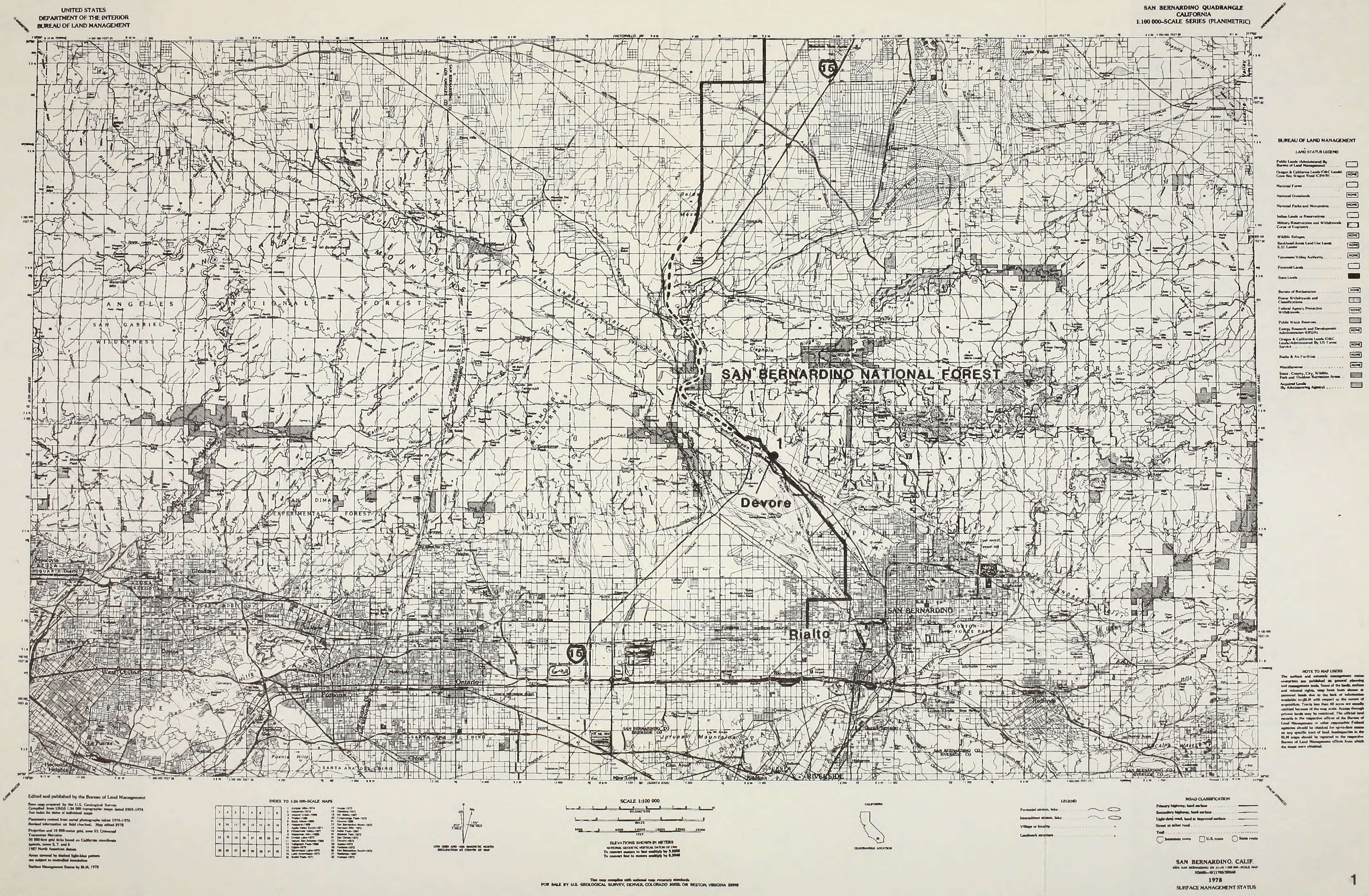
APPENDIX C

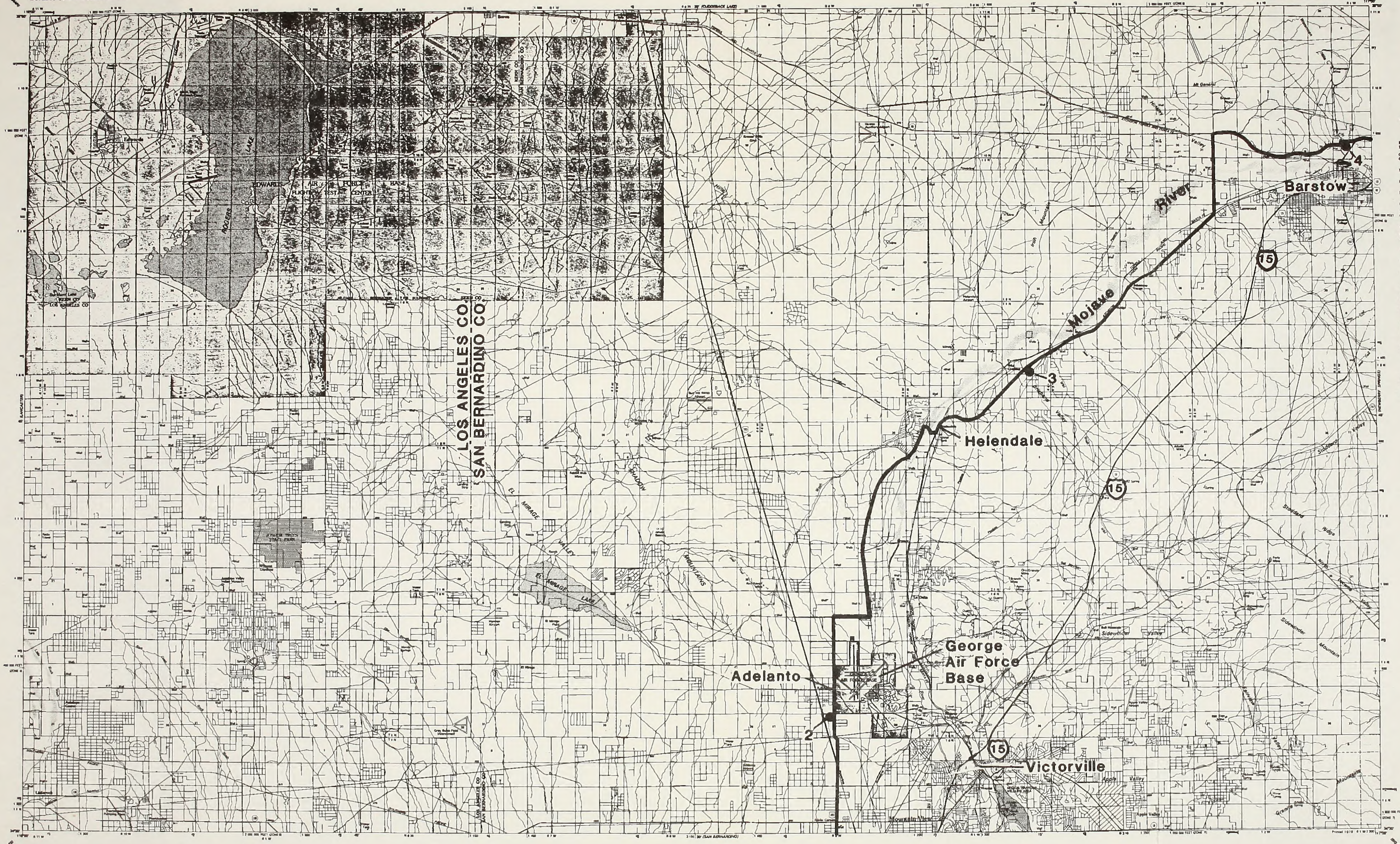
PROJECT ROUTE MAPS


UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
SAN BERNARDINO QUADRANGLE
CALIFORNIA
1:100 000-SCALE SERIES (PLANIMETRIC)
SAN BERNARDINO NATIONAL FOREST
ANGELES NATIONAL FOREST
SAN GABRIEL WILDERNESS
SAN DIMAS EXPERIMENTAL FOREST
Devore
Rialto
SAN BERNARDINO
Ontario
Pomona
West Covina
Redlands
RIVERSIDE
BUREAU OF LAND MANAGEMENT
LAND STATUS LEGEND
NOTE TO MAP USERS
Edited and published by the Bureau of Land Management
INDEX TO 1:24 000-SCALE MAPS
SCALE 1:100 000
ELEVATIONS SHOWN IN METERS
LEGEND
ROAD CLASSIFICATION
Primary highway, hard surface
Secondary highway, hard surface
Light-duty road, hard or improved surface
Street or urban road
Trail
Interstate route
U.S. route
State route
SAN BERNARDINO, CALIF.
1978
SURFACE MANAGEMENT STATUS

1

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VICTORVILLE QUADRANGLE
CALIFORNIA
1:100 000-SCALE SERIES (PLANIMETRIC)



BUREAU OF LAND MANAGEMENT

LAND STATUS LEGEND

- Public Lands (Administered By Bureau of Land Management)
- Oregon & California Lands (O&C Lands) Coos Bay Wagon Road (CBWR) — NONE
- National Forest — NONE
- National Grasslands — NONE
- National Parks and Monuments — NONE
- Indian Lands or Reservations — NONE
- Military Reservations and Withdrawals Corps of Engineers
- Wildlife Refuges — NONE
- Bankhead-Jones Land Use Lands (L.U. Lands) — NONE
- Tennessee Valley Authority — NONE
- Patented Lands
- State Lands
- Bureau of Reclamation — NONE
- Power Withdrawals and Classifications — NONE
- Federal Agency Protective Withdrawals — NONE
- Public Water Reserves — NONE
- Energy Research and Development Administration (ERDA) — NONE
- Oregon & California Lands (O&C Lands) Administered By US Forest Service — NONE
- Radio & Air Facilities — NONE
- Miscellaneous — NONE
- State, County, City, Wildlife, Park and Outdoor Recreation Areas
- Acquired Lands (By Administering Agency) — NONE

NOTE TO MAP USERS

The surface and minerals management status overprints are published as general planning and management tools. Some of the lands, surface and mineral rights, may have been shown as patented lands due to the lack of information available to BLM with respect to the nature of acquisition. Tracts less than 40 acres are usually omitted because of the map scale. Access through private lands may be restricted. The official land records in the respective offices of the Bureau of Land Management or other responsible Federal agencies should be checked for up-to-date status on any specific tract of land. Inadequacies in the BLM maps should be reported to the respective Bureau of Land Management offices from which the maps were obtained.

Edited and published by the Bureau of Land Management

Base map prepared by the U.S. Geological Survey
Compiled from USGS 1:24 000-scale topographic maps dated 1955-1973. See index for dates of individual maps

Planimetry revised from aerial photographs taken 1976 and other source data. Revised information not field checked

Projection and 10 000-meter grid, zone 11: Universal Transverse Mercator
50 000-foot grid ticks based on California coordinate system, zones 5 and 7
1927 North American datum. Map edited 1978

Protracted land lines are dashed
Surface Management Status by BLM, 1976

INDEX TO 1:24 000-SCALE MAPS

SCALE 1:100 000

ELEVATIONS IN METERS
To convert meters to feet multiply by 3.28
NATIONAL GEODETIC VERTICAL DATUM OF 1929

This map complies with national map accuracy standards
FOR SALE BY U.S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092

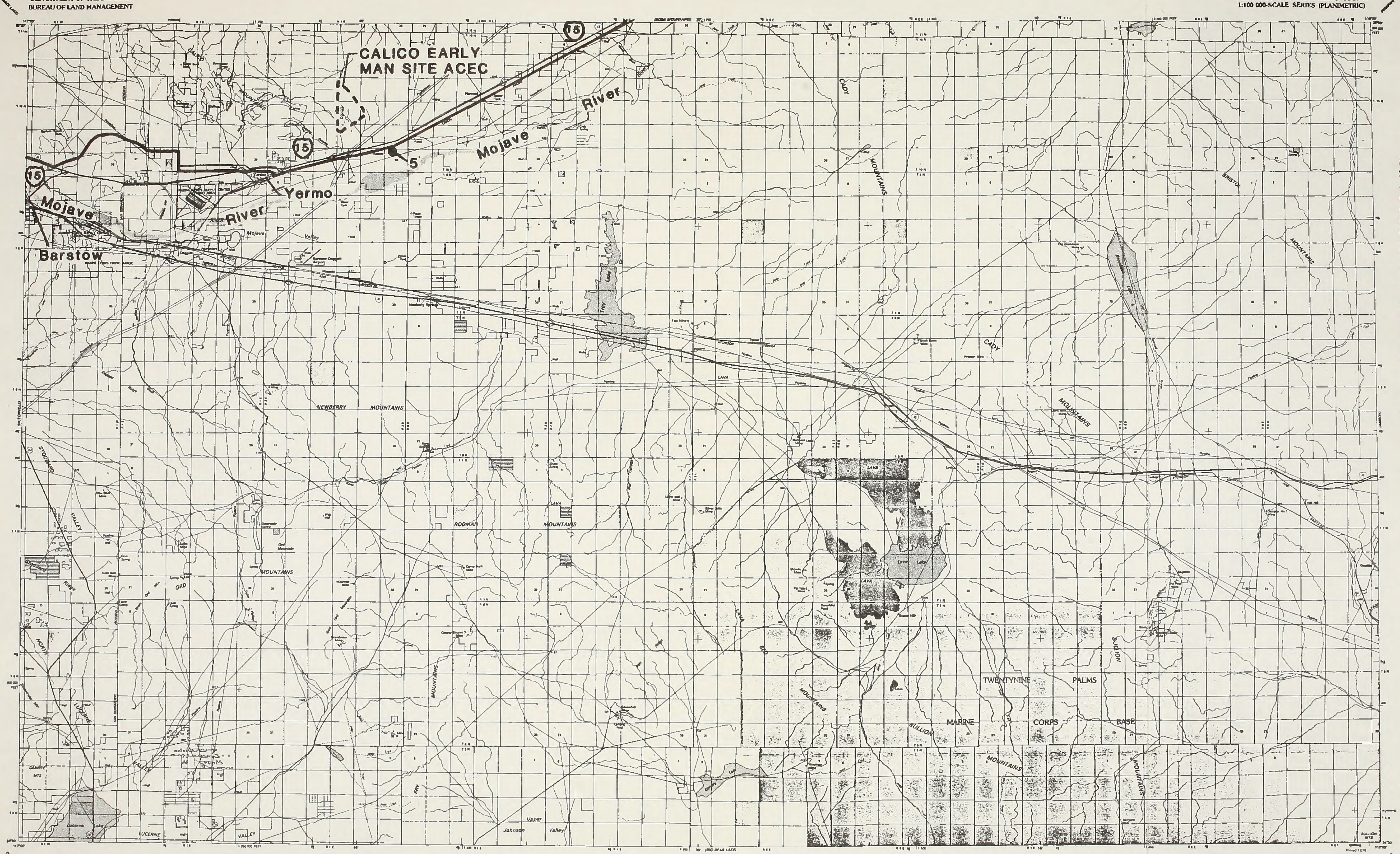
LEGEND

ROAD CLASSIFICATION

VICTORVILLE, CALIF.
1978
SURFACE MANAGEMENT STATUS

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

NEWBERRY SPRINGS QUADRANGLE
CALIFORNIA—SAN BERNARDINO COUNTY
1:100 000-SCALE SERIES (PLANIMETRIC)



BUREAU OF LAND MANAGEMENT

LAND STATUS LEGEND

Public Lands (Administered By Bureau of Land Management)	
Oregon & California Lands (O&C Lands) Coos Bay Wagon Road (CBWR)	NONE
National Forest	NONE
National Grasslands	NONE
National Parks and Monuments	NONE
Indian Lands or Reservations	NONE
Military Reservations and Withdrawals Corps of Engineers	
Wildlife Refuges	NONE
Bankhead-Jones Land Use Lands (L.U. Lands)	NONE
Tennessee Valley Authority	NONE
Patented Lands	
State Lands	
Bureau of Reclamation	NONE
Power Withdrawals and Classifications	NONE
Federal Agency Protective Withdrawals	
Public Water Reserves	
Energy Research and Development Administration (ERDA)	NONE
Oregon & California Lands (O&C Lands) Administered By US Forest Service	NONE
Radio & Air Facilities	NONE
Miscellaneous	NONE
State, County, City, Wildlife, Park and Outdoor Recreation Areas	NONE
Acquired Lands (By Administering Agency)	NONE

NOTE TO MAP USERS

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Edited and published by the Bureau of Land Management

Base map prepared by the U.S. Geological Survey
Compiled in 1977 from USGS 1:24 000-scale and 1:62 500-scale topographic maps dated 1953–1971. See index for dates of individual maps

Planimetry revised from aerial photographs taken 1976 and other source data. Revised information not field checked. Map edited 1978

Projection and 10 000-meter grid, zone 11:
Universal Transverse Mercator
50 000-foot grid ticks based on California coordinate system, zone 5
1927 North American datum

Surface Management Status by BLM, 1978

INDEX TO 1:24 000-SCALE AND 1:62 500-SCALE MAPS

SCALE 1:100 000

KILOMETERS

MILES

FEET

ELEVATIONS IN METERS
To convert meters to feet multiply by 3.28
NATIONAL GEODETIC VERTICAL DATUM OF 1929

This map complies with national map accuracy standards
FOR SALE BY U.S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092

QUADRANGLE LOCATION

LEGEND

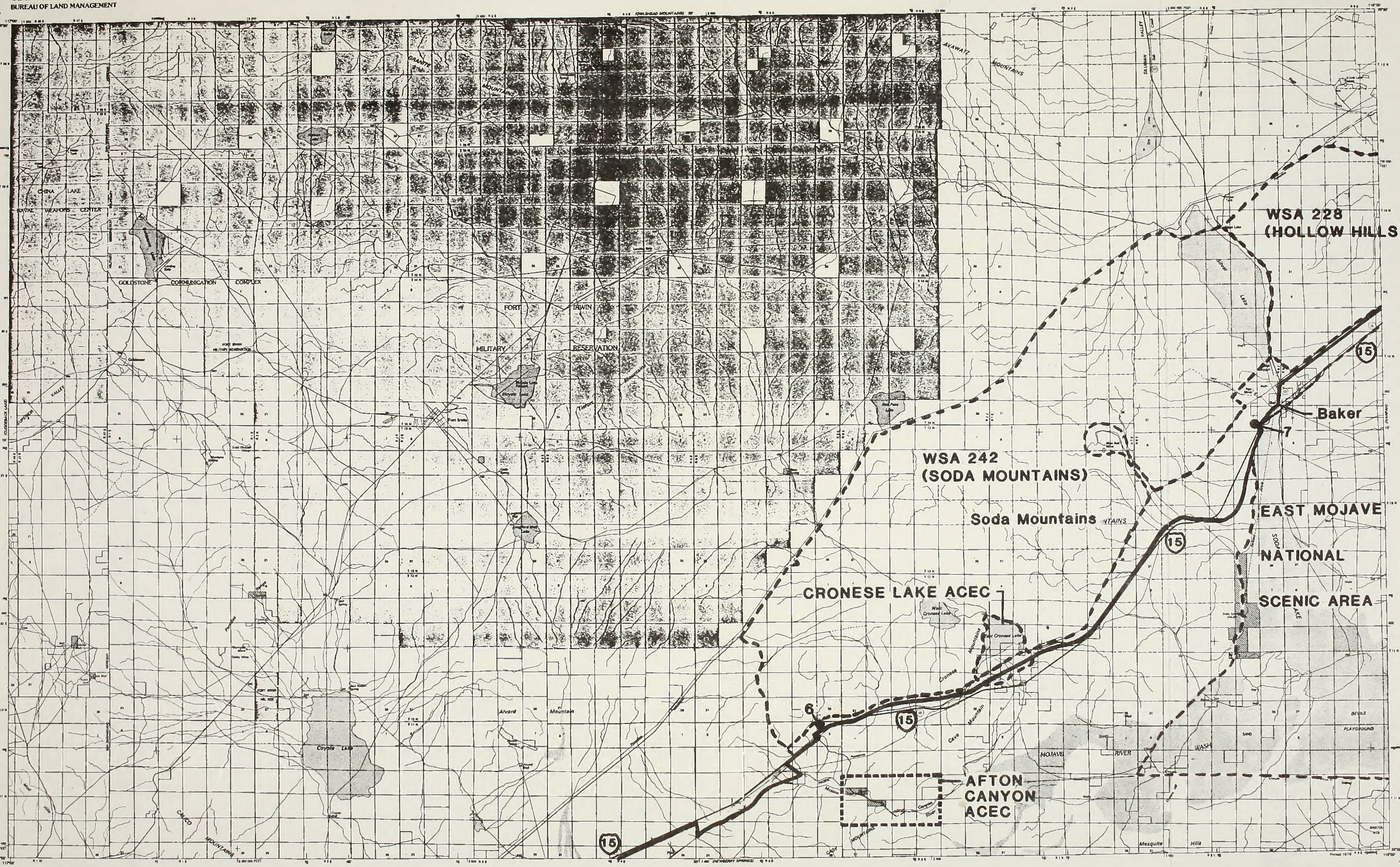
ROAD CLASSIFICATION

Primary highway, hard surface
Secondary highway, hard surface
Light-duty road, hard or improved surface
Street or other road
Trail
Interstate route · U.S. route · State route

NEWBERRY SPRINGS, CALIF.
NM30—W11600/30X60
1978
SURFACE MANAGEMENT STATUS

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SODA MOUNTAINS QUADRANGLE
CALIFORNIA—SAN BERNARDINO COUNTY
1:100 000-SCALE SERIES (PLANIMETRIC)



Edited and published by the Bureau of Land Management

Base map prepared by the U.S. Geological Survey
Compiled from USGS 1:62 500-scale topographic maps dated 1948–1956. See index for dates of individual maps

Planimetry revised from aerial photographs taken 1976 and other source data. Revised information not field checked

Projection and 10 000-meter grid, zone 11: Universal Transverse Mercator
10 000-foot grid ticks based on California coordinate system, zone 5
1927 North American datum Map edited 1978

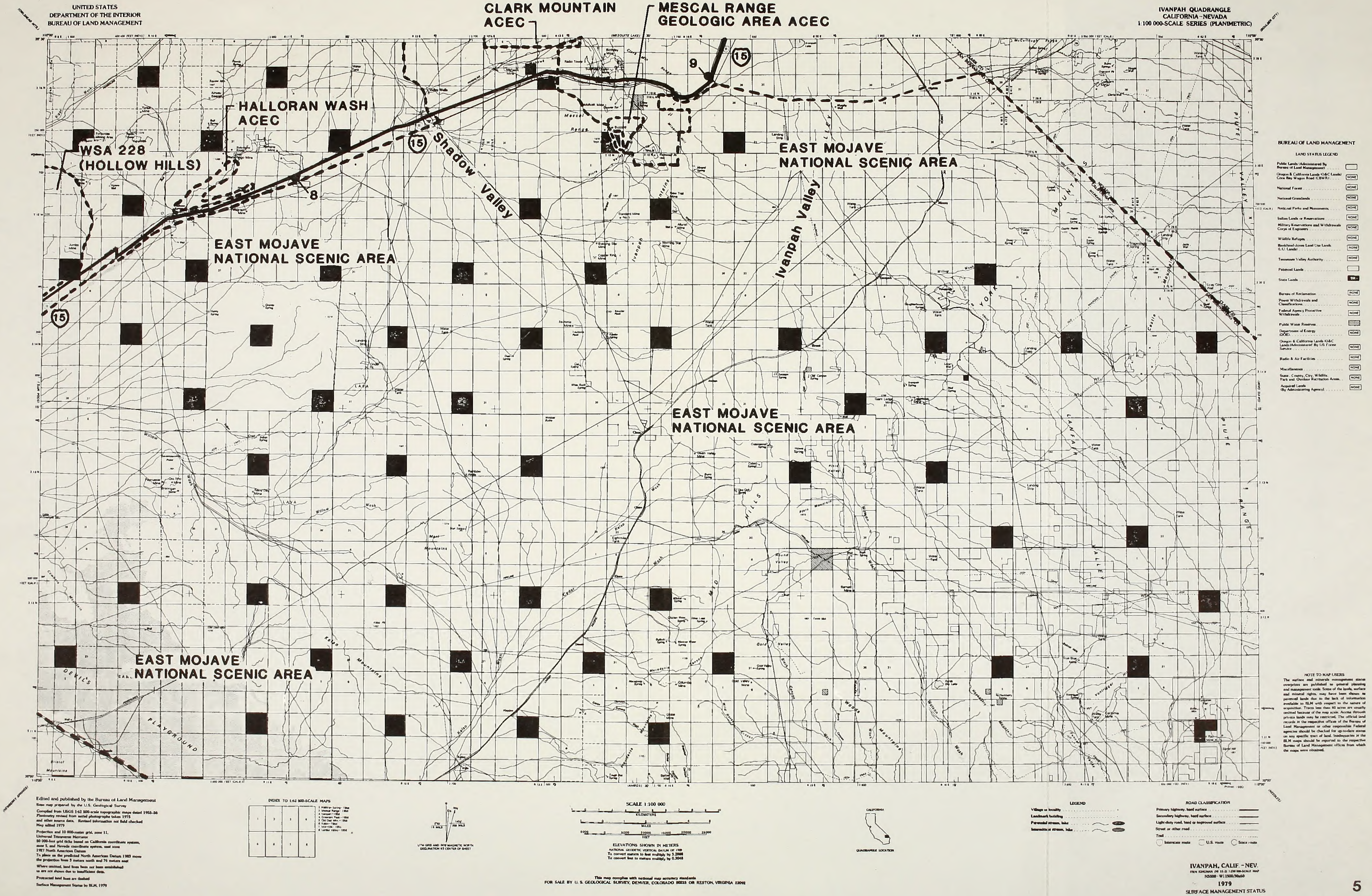
Protracted land lines are dashed

Surface Management Status by BLM, 1978

ELEVATIONS IN METERS
To convert meters to feet multiply by 3.28
NATIONAL GEODETIC VERTICAL DATUM OF 1929

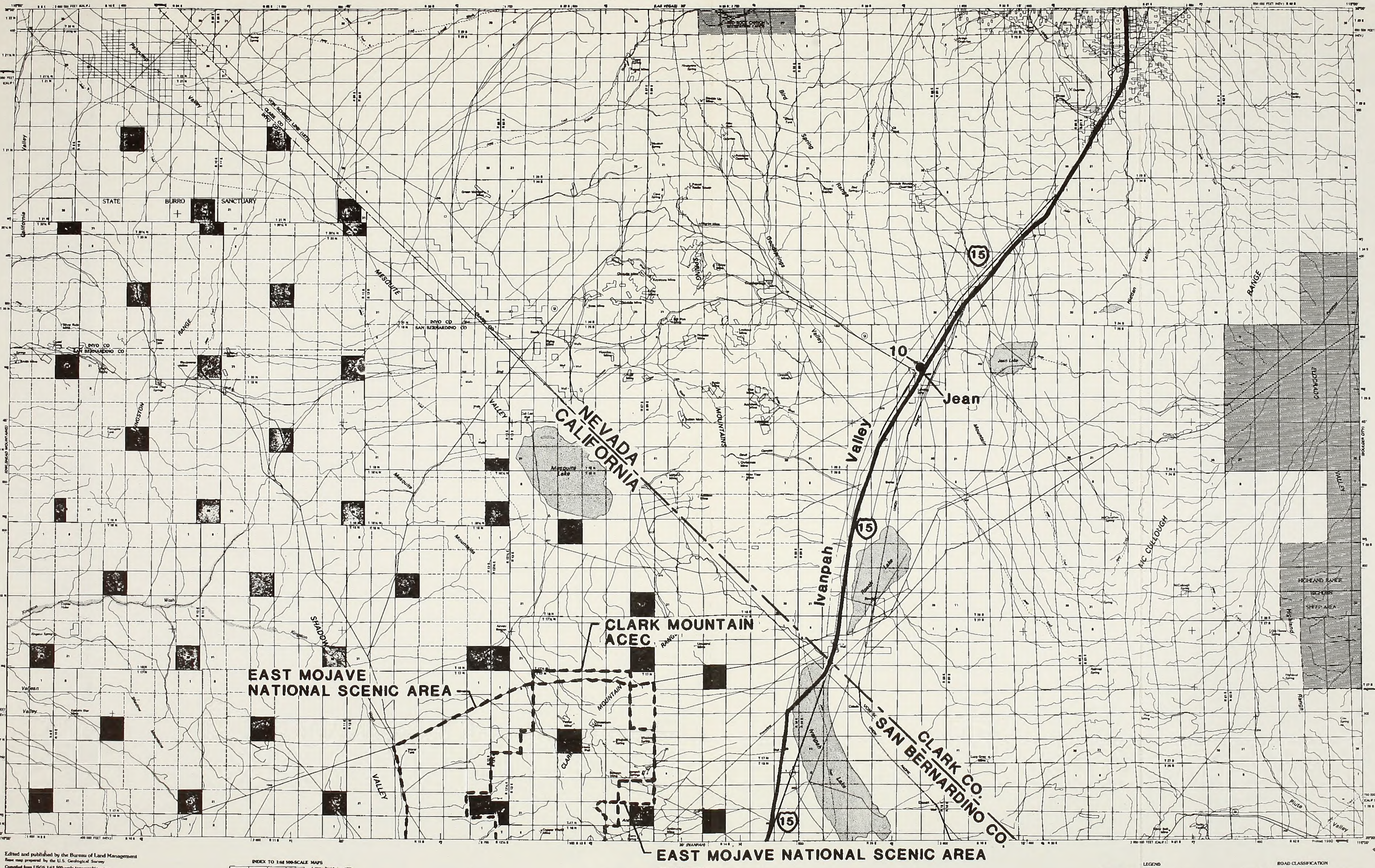
This map complies with national map accuracy standards
FOR SALE BY U.S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092

SODA MOUNTAINS, CALIF.
N3500–W11600/30X60
1978
SURFACE MANAGEMENT STATUS

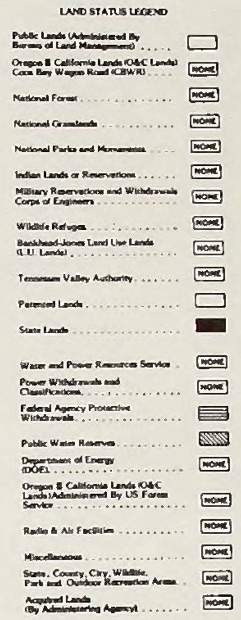

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CLARK MOUNTAIN ACEC
MESCAL RANGE GEOLOGIC AREA ACEC
IVANPAH QUADRANGLE
CALIFORNIA–NEVADA
1:100 000-SCALE SERIES (PLANIMETRIC)
HALLORAN WASH ACEC
WSA 228 (HOLLOW HILLS)
Shadow Valley
EAST MOJAVE NATIONAL SCENIC AREA
Ivanpah Valley
EAST MOJAVE NATIONAL SCENIC AREA
EAST MOJAVE NATIONAL SCENIC AREA
EAST MOJAVE NATIONAL SCENIC AREA
15
15
15
9
8
BUREAU OF LAND MANAGEMENT
LAND STATUS LEGEND
SCALE 1:100 000
ELEVATIONS SHOWN IN METERS
IVANPAH, CALIF.–NEV.
1979
SURFACE MANAGEMENT STATUS

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

MESQUITE LAKE QUADRANGLE
NEVADA—CALIFORNIA
1:100 000-SCALE SERIES (PLANIMETRIC)



BUREAU OF LAND MANAGEMENT



Edited and published by the Bureau of Land Management
Base map prepared by the U.S. Geological Survey
Compiled from USGS 1:62 500-scale topographic maps dated 1955–1960. See index for dates of individual maps
Planimetry revised from aerial photographs taken 1976 and other source data. Revised information not field checked Map Edited 1976
Projection and 10 000-meter grid, zone 11
Universal Transverse Mercator
50 000-foot grid ticks based on Nevada coordinate system, east zone, and California coordinate system, zones 4 and 5
1927 North American datum
Protracted land lines are dashed
Surface Management Status by BLM, 1980

INDEX TO 1:62 500-SCALE MAPS

SCALE 1:100 000

ELEVATIONS IN METERS
To convert meters to feet multiply by 3.28
NATIONAL GEODETIC VERTICAL DATUM OF 1929

QUADRANGLE LOCATION

LEGEND

ROAD CLASSIFICATION
Primary highway, hard surface
Secondary highway, hard surface
Light-duty road, hard or improved surface
Street or other road
Trail
Interstate route — U.S. route — State route

NOTE TO MAP USERS

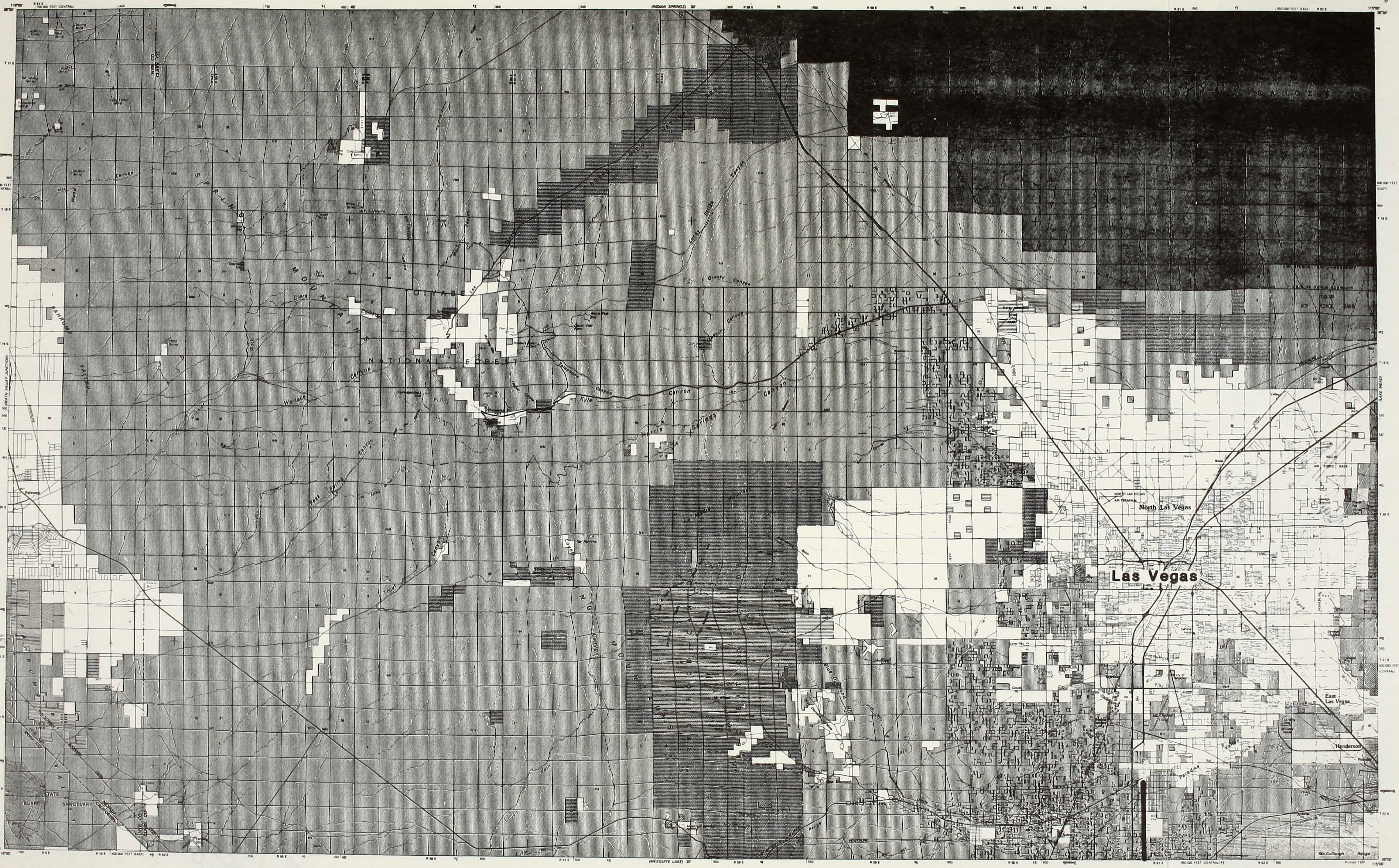
The surface and minerals management status overprints are published as general planning and management tools. Some of the lands, surface and mineral rights, may have been shown as patented lands due to the lack of information available to BLM with respect to the nature of acquisition. Tracts less than 40 acres are usually omitted because of the map scale. Access through private lands may be restricted. The official land records in the respective offices of the Bureau of Land Management or other responsible Federal agencies should be checked for up-to-date status on any specific tract of land. Inadequacies in the BLM maps should be reported to the respective Bureau of Land Management offices from which the maps were obtained.

This map complies with national map accuracy standards
FOR SALE BY U.S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092

MESQUITE LAKE, NEV.—CALIF.
1979
SURFACE MANAGEMENT STATUS

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

LAS VEGAS QUADRANGLE
NEVADA—CALIFORNIA
1:100 000-SCALE SERIES (PLANIMETRIC)



BUREAU OF LAND MANAGEMENT

LAND STATUS LEGEND

Public Lands (Administered By Bureau of Land Management)	
Oregon & California Lands (O&C Lands) Coos Bay Wagon Road (CBWR)	NONE
National Forest	
National Grasslands	NONE
National Parks and Monuments	NONE
Indian Lands or Reservations	NONE
Military Reservations and Withdrawals Corps of Engineers	
Wildlife Refuges	
Bankhead-Jones Land Use Lands (L.U. Lands)	NONE
Tennessee Valley Authority	NONE
Patented Lands	
State Lands	NONE
Water and Power Resources Service	
Power Withdrawals and Classifications	NONE
Federal Agency Protective Withdrawals	
Public Water Reserves	
Department of Energy (DOE)	NONE
Oregon & California Lands (O&C Lands) Administered By US Forest Service	NONE
Radio & Air Facilities	NONE
Miscellaneous	NONE
State, County, City, Wildlife, Park and Outdoor Recreation Areas	
Acquired Lands (By Administering Agency)	NONE

MINERALS OWNED BY THE FEDERAL GOVERNMENT

Mineral Rights	*Symbol*
All minerals	
Coal only	NONE
Oil and Gas only	
Oil, Gas, and Coal only	
Other	
No symbol indicates no Federal minerals	

NOTE TO MAP USERS

The surface and minerals management status overprints are published as general planning and management tools. Some of the lands, surface and mineral rights, may have been shown as patented lands due to the lack of information available to BLM with respect to the nature of acquisition. Tracts less than 40 acres are usually omitted because of the map scale. Access through private lands may be restricted. The official land records in the respective offices of the Bureau of Land Management or other responsible Federal agencies should be checked for up-to-date status on any specific tract of land. Inadequacies in the BLM maps should be reported to the respective Bureau of Land Management offices from which the maps were obtained.

Edited and published by the Bureau of Land Management
Base map prepared by the U.S. Geological Survey

Compiled from USGS 1:24 000 and 1:62 500-scale topographic maps dated 1952-1974. See index for dates of individual maps

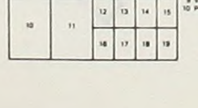
Planimetry revised from aerial photographs taken 1976
Revised information not field checked. Map edited 1978

Projection and 10 000-meter grid, zone 11: Universal Transverse Mercator
50 000-foot grid ticks based on Nevada coordinate system, east and central zones
1927 North American datum

Where omitted, land lines have not been established or are not shown due to insufficient data.
Protracted land lines are dashed

Surface Management Status by BLM, 1980
Minerals Management Status by BLM, 1980

INDEX TO 1:24 000 AND 1:62 500-SCALE MAPS



1 Mt. Sterling-1957
2 Charleston Peak-1957
3 Corn Creek Springs NW-1974
4 Corn Creek Springs-1974
5 Gass Peak-1952
6 Grapevine Spring-1974
7 Tule Springs Park-1974
8 Gass Peak SW-1974
9 Valley-1974
10 Pahrump-1958
11 Mountain Springs-1957
12 La Madre Mtn.-1972
13 Blue Diamond NE-1972
14 Las Vegas NW-1973
15 Las Vegas NE-1973
16 Blue Diamond-1972
17 Blue Diamond SE-1972
18 Las Vegas SW-1967
19 Las Vegas SE-1973

UTM GRID AND 1978 MAGNETIC NORTH DECLINATION AT CENTER OF MAP

SCALE 1:100 000

KILOMETERS
MILES
FEET

ELEVATIONS SHOWN IN METERS
NATIONAL GEODETIC VERTICAL DATUM OF 1929
To convert meters to feet multiply by 3.2808
To convert feet to meters multiply by 0.3048

QUADRANGLE LOCATION

LEGEND

- Village or locality
- Landmark building
- Perennial stream, lake
- Intermittent stream, lake

ROAD CLASSIFICATION

- Primary highway, hard surface
- Secondary highway, hard surface
- Light-duty road, hard or improved surface
- Street or other road
- Trail
- Interstate Route / U.S. Route / State Route

This map complies with national map accuracy standards
FOR SALE BY U.S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
and
BLM STATE OFFICE, RENO, NV 89509

LAS VEGAS, NEV.—CALIF.
SW/4 LAS VEGAS (NJ 11-12) 1:250 000-SCALE MAP
N3600—W11500/30X60
1978

SURFACE-MINERALS MANAGEMENT STATUS