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TECHNICAL APPENDIX D

Biological Resources Reports

Environmental Impact Statement &
Environmental Impact Report
for the proposed

Mesquite Regional Landfill

Imperial County, California

SCH. No. 92051024
BLM No. CA-060-02-5440-10-B026

Prepared by the
Bureau of Land Management
California Desert District

and the
County of Imperial
Planning & Building Department

Environmental Consultant
The Butler Roach Group, Inc.
San Diego, California

April 1994

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for the proposed

MESQUITE REGIONAL LANDFILL

IMPERIAL COUNTY, CALIFORNIA

SCH. No. 92051024
BLM No. CA-060-02-5440-10-B026

prepared for

BUREAU OF LAND MANAGEMENT
California Desert District
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El Centro, California

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Planning And Building Department
939 Main Street
El Centro, California

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MESQUITE REGIONAL LANDFILL EIS/EIR

APPENDIX D-1

BOTANICAL AND WILDLIFE ANALYSIS

JUNE 1993

BOTANICAL AND WILDLIFE ANALYSIS OF THE PROPOSED MESQUITE REGIONAL LANDFILL STUDY AREA

A Report

Submitted to

Environmental Solutions, Inc.
21 Technology Drive
Irvine, California 92718

from

The Office of Arid Lands Studies
University of Arizona
Tucson, Arizona 85719

May 1992

Revised August 1992

Second Revision June 1993

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BOTANICAL AND WILDLIFE ANALYSIS OF THE PROPOSED MESQUITE REGIONAL LANDFILL STUDY AREA

Martin M. Karpiscak
Jeffrey Zauderer

INTRODUCTION

At the request of Environmental Solutions, Inc. of Irvine, California, a general botanical and wildlife assessment was performed on land east of Glamis, California. The project site under consideration is being evaluated for the proposed Mesquite Regional Landfill. The scope of this study encompasses the entire project site, about 70 percent of which has been evaluated in previous biological inventories. We completed a review of previous work, performed a supplementary survey of site areas not previously addressed, and prepared a comprehensive assessment of the vegetation and wildlife resources on the project site.

The literature review and on-site survey were performed by Martin Karpiscak, Jeffrey Zauderer, and other staff of the University of Arizona, Office of Arid Lands Studies. Team members have over 60 years of combined field experience in the Sonoran Desert and have performed field studies and prepared environmental documents for such nationally known projects as the Palo Verde Nuclear Generating Station, the Mt. Graham Astrophysical Area, and Desertron, the proposed site for the super collider in Arizona. The Office of Arid Lands Studies has performed vegetation research studies at the adjacent Mesquite Mine for the last 3 years and is very familiar with the area.

SITE LOCATION

The area proposed for the Mesquite Regional Landfill is located in a relatively dry part of the Sonoran Desert called the Lower Colorado Valley subdivision of the Sonoran Desert or the Colorado Desert (Figure 1). The Sonoran Desert covers some 119,370 square miles in Mexico, Arizona, and California. Only about 6,200 square miles of the Sonoran Desert is found in the state of California and all of this area is classified as part of the Lower Colorado Valley subdivision (Shreve and Wiggins, 1964). The Colorado Desert is generally characterized as different from the whole Sonoran Desert by its western location and xeric flora which does not receive the level of summer precipitation that the Eastern Arizonan counterpart does.

DETAILS OF THE SITE LOCATION

The project study area consists of about 4,700 acres located south of the Chocolate Mountains and north of State Highway 78 in Imperial County, California. The Imperial Valley is bounded on the west by the Peninsular Range, and on the east by the Cargo Muchacho Mountains which are sometimes thought of as part of the greater Chocolate Mountains, and the Colorado River. The Mexican border forms the southern extent of the valley, and the northern boundary extends to the middle of the Salton Sea.

The 1992 Supplemental Field Inventory study site (Figure 2) consists of about 1,400 acres and is situated in T.13S., R.19E., W 1/2 of section 15, SW 1/4 of section 7, W 1/2 of section 18, the W 1/2 of the W 1/2 of section 19 and the boundaries of a proposed railroad spur that will connect with the existing rail line near Glamis T.13., R.18 E. (7.5 minute U.S.G.S. topographic

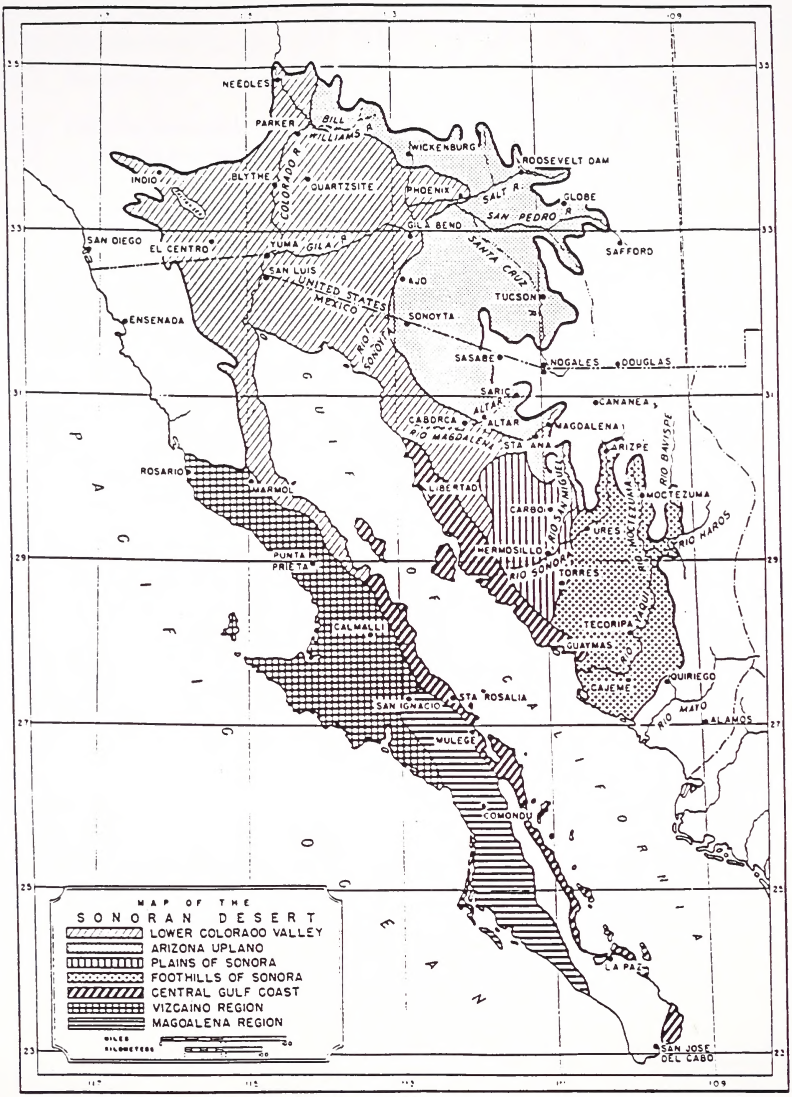

Figure 1. Map of Sonoran Desert
(Shreve and Wiggins, 1964).

MESQUITE REGIONAL LANDFILL

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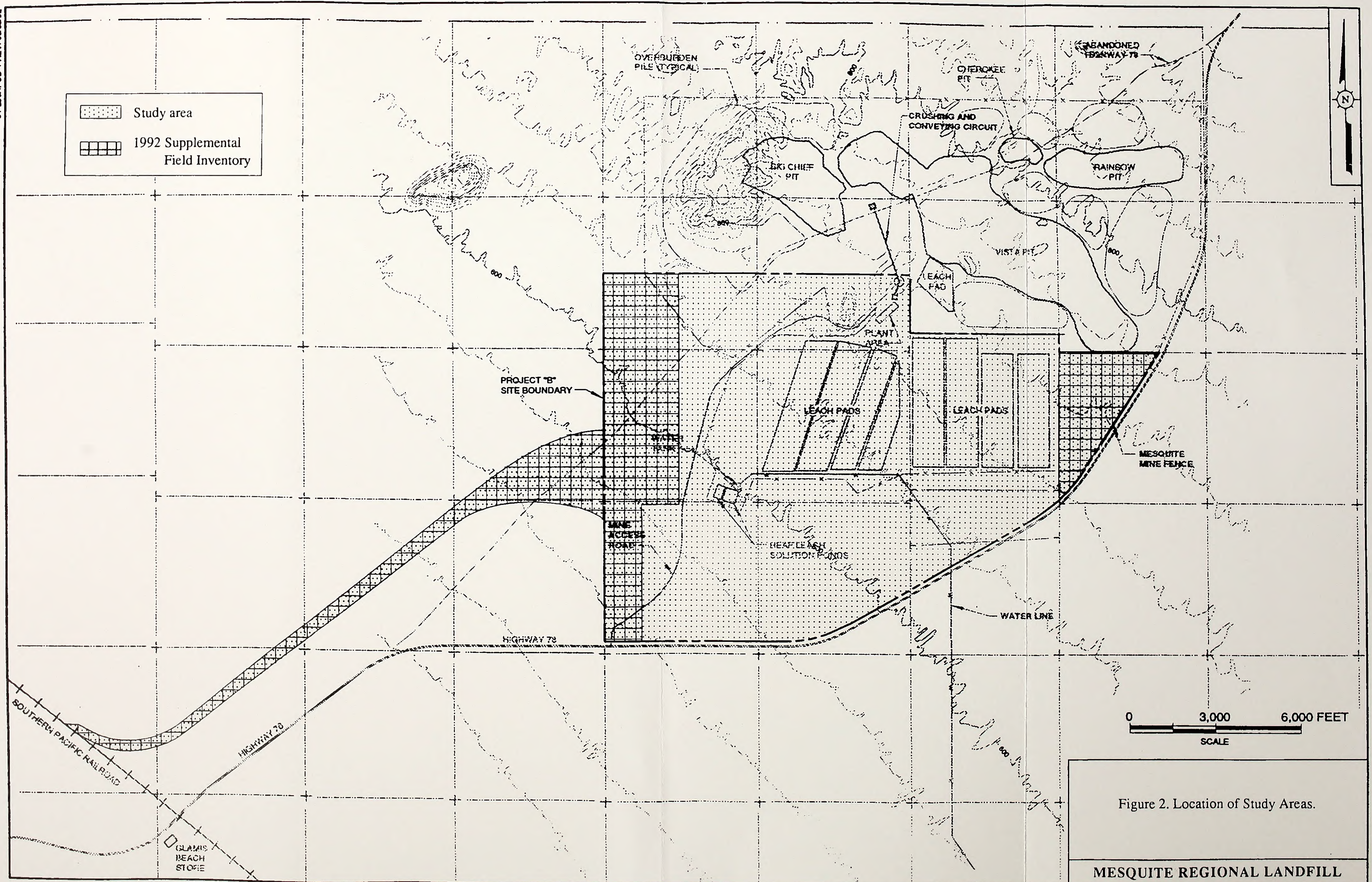

Figure 2. Location of Study Areas.

maps of Ninemile Wash Quadrangle and East of Acolita Quadrangle in California).

The previously surveyed areas (Figure 3) consist of about 3,300 acres and includes T.13 S, R 19 E, section 16, section 17, E 1/2 of section 18, SE 1/4 of section 7, the S 1/2 of section 8, E 1/2 of the W 1/2 as well as the E 1/2 of section 19, all of section 20 north of State Highway 78 (N 1/2 plus the SW 1/4 and part of the SE 1/4), and all of section 21 north of Highway 78 (most of the N 1/2) including most of tract 38 (7.5 minute U.S.G.S. topographic map of Ninemile Wash Quadrangle and east of Acolita Quadrangle in California).

PHYSICAL CONDITION OF THE STUDY SITE

State Highway 78, a newly-realigned 2-lane paved road, is located along the southern boundary of the proposed Mesquite Regional Landfill project site in sections 15, 21, 20, and 19. A paved access road from State Highway 78 to the Mesquite Mine runs through the area of this study. At the intersection of State Highway 78 and the existing rail line is the settlement of Glamis. This settlement consists of several structures and a service station and "beach store" used by many of the off-road vehicle (ORV) visitors to the Sand Dunes just west of Glamis. The Mesquite Mine and related facilities dominate the proposed Mesquite Regional Landfill site (Figure 2). The old alignment of State Highway 78 has been removed and the old roadbed has been ripped. The dirt-covered roadway, however, continues to be used primarily by trucks and vehicles engaged in an active gravel mining operation. Several other active gravel mining facilities are located in the general vicinity. The only "permanent" housing in the area are structures at Glamis and a mobile home

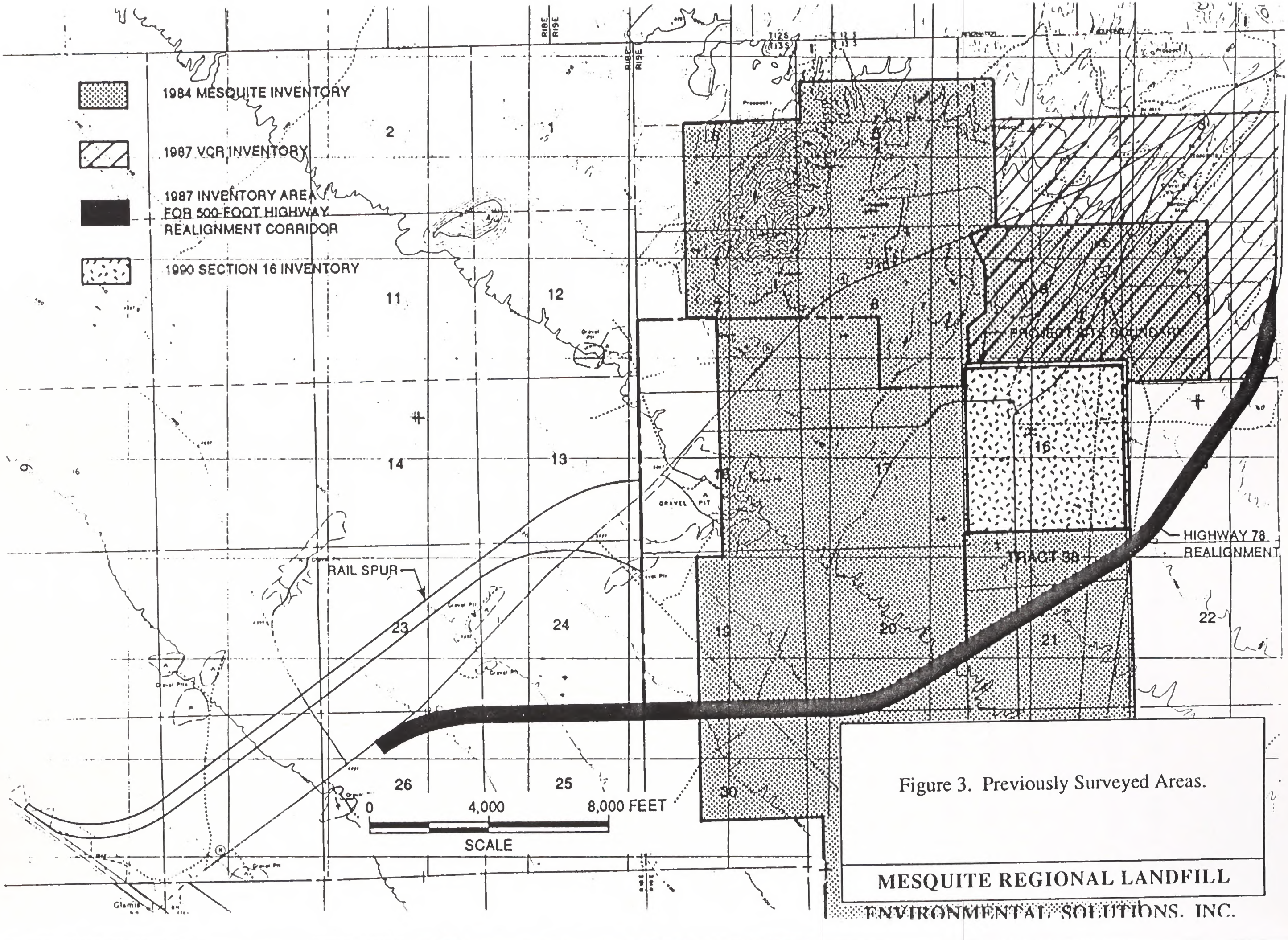

Figure 3. Previously Surveyed Areas.

near the entrance to the mine. The military established a field camp and was observed to use an area just south of the proposed rail spur with possible incidental use of the actual study area that is covered by this report. Seasonal use of the area by recreationists, many with campers and ORVs, increases the intensity of activity at certain times of the year especially in and around Glamis.

The study area field surveyed in 1992 (1992 Supplemental Field Inventory) for this report, as denoted in Figure 2, has no residences at this time. The site, especially areas along the proposed railroad spur, appears to be used for various recreational activities such as target practice, camping, walking, and off-road vehicle driving. The study area has also been the site of illegal wildcat dumping of trash such as worn tires and miscellaneous items such as old oil cans and food containers and is littered with firearm and military shell casings. Gravel pits, especially in Section 18, have impacted the area extensively since several feet of the surface have been removed with little or no attempts made at reclamation.

The areas previously field surveyed are dominated by the Mesquite Mine. One resident is present on the site living in a mobile home near the entrance to the mine (Mr. Singer).

METHODS

BACKGROUND LITERATURE REVIEW

A literature review was conducted of environmental reports prepared for the study area covered in this report and relevant scientific references and field guides (Environmental Solutions, Inc., 1987; Butler/Roach Group, Inc. and St. Clair Research Systems, Inc., 1984; Pritchett, 1984; and Wier, 1983). The primary sources of the literature used are listed in selected references. The Bureau of Land Management (BLM) and the California Department of Fish and Game (CDFG) were contacted for input regarding species of concern. Information was obtained from the California Natural Diversity Data Base (NDDB), a unit of the CDFG, about sensitive species locations known from the site. Printouts of the NDDB information obtained are attached in Appendix A. Additional sensitive species not indicated in the CDFG printouts have been noted and are listed below. In addition, both the Herbarium at the University of Arizona which specializes in desert flora, especially Sonoran Desert plants, and the mammal collection at the University of Arizona were visited on several occasions to obtain both information and species identification. The reference section of this report also lists publications consulted in the field but not cited in the text of this report.

SUPPLEMENTAL FIELD STUDY

Field work for this study was performed primarily during the months of February, March, and April 1992 by personnel from the Office of Arid Lands Studies (OALS) at the University of Arizona. Team members have extensive experience in environmental assessments as noted above. A total of about 400 hours of on-site field surveys of the area proposed for the Mesquite Regional Landfill and railroad spur were performed.

The study was conducted by walking transects within each of the subsections of the study area (Figure 2). Transects made in interfluvial areas were walked by 2 to 4 individuals at about 60-foot intervals. Walking transects within dense wash areas were made at approximately 30-foot intervals. A total of about 4,700 acres were covered by walking transects. Selected areas of dense and diverse plant cover were surveyed once each month during February, March, and April, 1992. Both the proposed railroad spur as well as the other portions of the study area were given survey coverage by west-east or east-west walking transects. All wildlife and sign were recorded on these walks. Each plant and animal species encountered was noted and recorded and photographs were taken of selected materials.

The area was also studied using plant line transects, interviews, and small mammal trapping. Sherman folding aluminum traps were used for the small mammal trapping. They were baited with oatmeal and set about 30 feet (10 paces) apart. The traps were set just prior to nightfall and the captured animals identified and released shortly after sunrise the following morning. A total of 536 traps were set at nine locations during the study.

Perennial plant cover data for the proposed railroad spur was determined by running 100 meter line transects beginning at the western end of the proposed spur and working east. These transects were started approximately 100 feet in from the northern boundary marker and made every 1,000 feet. These transects were made in a north-south direction. Additional cover data were obtained by conducting 150 meter and 50 meter transects on the northern bank and southern bank of a major wash.

Although no special transects were conducted for tortoise, the field team members were alert to observe any sign of this animal. Environmental Solutions, Inc. requested a separate study to be performed by others to determine the presence of tortoise. Interviews were held with Rocky Thompson (CDFG), Joe Brana (CDFG), Darlene McGriff (CDFG), and Dennis Vaughan (Gold Fields Operating Company).

Due to the time constraints of the study, some information could not be determined. Such information includes:

Comparison of the number of species observed in a high rainfall year to those in a low rainfall year.

The density of perennial plants is likely to remain constant; however, characteristics such as vigor and reproductive capacity may change with precipitation.

Substantial rainfall generally germinates a greater variety and number of annuals than in dry years. Hence, a high rainfall year makes the collection and identification of plant species easier than in dry conditions; but the species present in a high rainfall year do not leave the site in dry years. With precipitation and subsequent plant growth/reproduction, there is typically a positive response in wildlife species population growth.

Winter birds, species that use the area seasonally as wintering habitat, or as a phase of migration, could find the area more attractive during a high rainfall year when foliage density is greatest, and there is an abundance of flowering and fruiting as well as high insect populations.

It was not possible to study the number of birds and duration of stay at the site as part of this inventory study.

This report contains two tables for each of the major taxa addressed. The first table lists only those species actually observed in the field by OALS personnel, on the 1992 Supplemental Field Inventory study site as indicated in Figure 2, during the field visits in February, March, and April 1992. The second table presents a comprehensive listing of species from several sources including 1) the 1992 OALS field surveys (field work conducted for this report), 2) additional field observations made by OALS personnel prior to 1992 (Karpiscak et al., 1991, 1990, 1989), 3) various biological studies that have been conducted for the Mesquite Mine (Environmental Solutions, Inc., 1987 [VCR study]; Butler/Roach Group, Inc. and St. Clair Research Systems, Inc., 1984 [Final EIR/EA]; Weir, 1983), and 4) information from a 1992 tortoise clearance program for section 16 (Field Team Notes, 1992).

When combined, the result of all the surveys is a scope of species for the entire study area. Thus, the tables containing data from all the reports presents the best picture of what flora and fauna can be found in the area proposed for the project.

RESULTS

OVERVIEW

The dominant perennial species (based on cover obtained from line transect data taken during the 1992 Supplemental Field Inventory, see Appendix B) in the study site are creosote bush (*Larrea tridentata)*, blue paloverde (*Cercidium floridum*), and ironwood (*Olneya tesota*). Annual plants comprise a significant proportion of the flora although their occurrence is usually limited to short periods following occasional rains. A distinct seasonal element is correlated with animal activity. As this survey was conducted during late winter/early spring, it was an optimal time to observe wildlife. Several birds were seen to use the site for nesting although many of the bird species observed use the area during migration and visitation. Reptiles, especially lizards, were common. The area is used by mammals such as blacktailed jackrabbits, deer, and kit fox. No permanent surface water is present on-site although ephermal ponds can be found in undrained depressions following heavy rains.

SURFACE PHYSIOGRAPHY

The Mesquite Regional Landfill study site is located in the western margin of the Lower Colorado Valley subdivision of the Sonoran Desert, also called the Colorado Desert. The study area lies between the upper bajada slopes of the Chocolate Mountains and the Algodones Dunes. The Algodones Dunes belt is aligned along a fault that is most likely a continuation of the San Andreas fault system, extending southward to the Gulf of California (Olmsted, Loeltz, and Irelan, 1973). The southwest dune field edge is adjacent to an old shoreline created by either an arm of the Gulf of

California or an ancestral lake formed by the Colorado River (Olmsted, Loeltz, and Irelan, 1973). Dates for the shoreline are around 37,000 YBP (Olmsted, Loeltz and Irelan, 1973). Piedmont surfaces slope towards the present dune field. The well-varnished pavement areas of present day interfluves on upper bajadas are of Pleistocene age. Dissected fans and abandoned channels with less-developed pavement and varnish are probably middle to late Pleistocene, while the channel fill in present washes incised into older flood plains is of recent age, although may in part be late Pleistocene (Dillon, 1975).

PRECIPITATION

Based on data collected at the Mesquite Mine for the period 1983 to June 1992, the average annual rainfall is close to 3.5 inches, with a standard deviation of close to 2.2 inches (Table 1). The data in Table 1 shows that 3 years out of 10 have annual rainfall of nearly or greater than 5 inches; a 30 percent chance of such a year, based on the period of data. The year 1992 is unusual in having 4 inches of rain in March, which normally is a dry month. The usual rain season is from July through January. Over the period of record, 2 years have had single months with greater than 3 inches of rainfall (December 1984; 3.14 inches, and March 1992; 4.07 inches). Thus, there is a 1 in 5 chance (20 percent) of such a year, based on the period of data.

DRAINAGE CHARACTERISTICS

The drainage within the study area is linear parallel. In the upper reaches, active channels are incised within wider channels that are now covered with desert varnish. The active channels maintain small flood terraces composed of light reddish-tan clayey silt. These mini-terraces are 2 to 3 feet above the gravel channel supporting the relatively dense bank

TABLE 1

YEARLY RAINFALL RECORD AT MESQUITE MINE

Year	Rainfall (in.)
1983	1.47
1984	4.99
1985	5.18
1986	3.17
1987	3.03
1988	Data missing
1989	0.01
1990	2.56
1991	3.66
1992 (through June)	7.46

Average annual rainfall: 3.5 inches
Standard deviation: 2.2 inches

Average + 1 standard deviation = 5.7 inches
95% confidence level = 7.13 inches
Average + 2 standard deviations = 7.9 inches

habitats with blue paloverde (refer to Appendix B for the transect data of the bank shrub community). The mini-terraces are in dynamic equilibrium with erosive and depositional processes. Modern artifacts over the last 50 years to present (cans, bottles and other debris) are embedded within the recession deposition of the terraces and banks, replacing flood-scoured sections. Recent flow depths in some of these reaches are at least 3 feet across channels 10 to 15 feet wide. These flows do not usually seem to spill over onto the older varnished floodplains. Thus, the upper reaches of the study-area slopes are characterized by confined flow in high bio-diverse washes with silty banks and mini-terraces, separated by broad dark-varnished pavement surfaces of much older (Pleistocene) floodplains and piedmont. The depth and duration of flow with recession deposition of silts is important in maintaining the high diversity and cover of these habitats.

Drainage at the lower (southern) end of the study area consists of shallower and broader channels with sparser obligate wash vegetation. Interfluves are not varnished and pavement structure is not greatly developed as a result of the fluvial reworking of aeolian deposits and aeolian reworking of loose, fluvial sediment. The lower southern surfaces near the railroad and dune front are lower bio-diverse perennial communities with less channelled flows and a tendency of lateral flow spreading and sheet flow. Dillon (1975) considers that this process of incisive degradation in the upper bajada, and aggradation along the Salton Trough is a continuation of post-Miocene/early Pliocene tectonic processes that create subsidence and rifting in the Imperial Valley.

VEGETATION

Vegetational History

Vegetation during the late Wisconsin up to about 11,000 years before present (YBP) in the area around the study site would probably show single-leaf pinon above 600 m with mesic woodland plants. Below 600 m, a xeric juniper woodland with California juniper, shrub live oak, Joshua tree, Whipple yucca, and Bigelow beargrass probably would occur to about 300 m. Below 300 m, the vegetation would be desert scrub without woodland elements; creosote was present in the xeric juniper woodland and in desert scrub (based on data from Van Devender, Thompson and Betancourt, 1987). The Holocene vegetation established after about 8,900 YBP in our area would generally be characterized by the disappearance of single-leaf pinon and woodland vegetation and the establishment of the lower desert scrub, although early Holocene climate dynamics may have maintained some of the cold-xeric vegetation at high elevations and in the lower Colorado River Valley.

Desert scrub, the creosote-white bursage assemblage, however, was present during the late Wisconsin period below 300 m in the Lower Colorado River Valley below 34^{o} N. latitude to the Gulf of California. After 8,900 YBP the desert scrub was established in the Sonoran Desert, and around 8,650 YBP in the Picacho Peak, Imperial Co., California area (Van Devender, Thompson and Betancourt, 1987; Van Devender and Spaulding, 1979).

The desert scrub probably contracted to its present riparian obligate distribution of microphyllous legumes and lycium by about 4,000 YBP, with a reduction in rainfall and winter freezes to the modern condition (Van Devender, et al., 1987).

Modern Botanical Setting

Some 95 plant species have been found in the Supplemental Field Inventory area and are listed in Table 2. Only a couple of species that have been reported for the areas that were previously field surveyed were not found within the Supplemental Field Inventory area (Table 3). The listing of species for the overall area, however, has been greatly expanded by the Supplemental Field Inventory survey. This probably was the result of the greater than average precipitation in 1992 and the repeated site visits to the area during the study period by the field team.

Perennial Plants

The 1992 Supplemental Field Inventory area of study lies between about 300 to 800 feet elevation. Above approximately 500 feet (Community A: see explanation to map [Figure 4] below) where washes are separated by varnished pavement interfluves, ironwood and blue paloverde are the dominant obligate perennial species. *Lycium* spp. and desert lavender (*Hyptis emoryi)* are sub-dominant perennial woody shrubs found along banks with scattered jojoba (*Simmondsia chinensis*) bushes. Creosote (*Larrea tridentata*) with scattered coach whip (*Fouquieria splendens*) forms the dominant interfluvial woody perennial cover. Scattered white bursage (*Ambrosia dumosa*) and occasional ratany (*Krameria parvifolia*) also occur as inter-fluvial woody perennials with brittle bush (*Encelia farinosa*).

Transects show that intercepted perennial cover varies from 0 percent to about 90 percent continuous coverage parallel along the major washes (Appendix B) with the lesser cover found on desert pavement and the greater cover found on the areas of sandy aeolian deposits. The overall cover is 5 percent based

TABLE 2.1

PLANT SPECIES OBSERVED AT THE PROPOSED
MESQUITE ARID LANDFILL STUDY SITE

Common Name	Scientific Name	Plant Characteristics[1]
POLYGONACEAE (Buckwheat)		
Brittle spine flower	*Chorizanthe brevicornu*	ANF
Corrugated spiny herb	*Chorizanthe corrugata*	ANF
Rigid spiny herb	*Chorizanthe rigida*	ANF
Skeleton weed	*Eriogonum deflexum*	ANF
Desert trumpet	*Eriogunum inflatum*	APNF
NYCTAGINACEAE (Four O'clock)		
Trailing four-o'clock	*Allionia incarnata*	PNF
Bigelow's four-o'clock	*Mirabilis bigelovii*	PNF
PORTULACACEAE (Portulaca)		
Desert pot herb	*Calandrinia ambigua*	ANS4F
CHENOPODIACEAE (Goose foot)		
Desert holly	*Atriplex hymenelytra*	NS
Pigweed	*Chenopodium album*	AIF
AMARANTHACEAE (Amaranth)		
Oblong-leafed tidestrom	*Tidestromia oblongifolia*	NHS
CACTACEAE (Cactus)		
Fishhook, Pincushion	*Mammillaria tetrancistra*	NS4S
Buckhorn cholla	*Opuntia acanthocarpa*	NS4S
Beavertail	*Opuntia basilaris*	NS4S
Teddy bear cholla	*Opuntia bigelovii*	NS4S
Diamond cholla	*Opuntia ramosissima*	NS4S
PAPAVERACEAE (Poppy)		
Minute flowered desert poppy, Little gold poppy	*Eschscholzia minutiflora*	ANF
Parish poppy	*Eschscholzia parishii*	ANF
CRUCIFERAE (*BRASSICACEAE*) (Mustard)		
Black mustard	*Brassica nigra*	AIF
Pepper grass	*Lepidium dictyotum*	ANF
Bladder pod	*Lesquerella palmeri*	PNF
London rocket	*Sisymbrium irio*	AIF
RESEDACEAE (Mignonette)		
Narrow-leafed cambess	*Oligomeris linifolia*	ANS4F

TABLE 2.2

PLANT SPECIES OBSERVED AT THE PROPOSED MESQUITE ARID LANDFILL STUDY SITE

Common Name	Scientific Name	Plant Characteristics[1]
ROSACEAE (Rose)		
Desert range almond	*Prunus fasciculata*	NS
LEGUMINOSAE (FABACEAE) (Pea)		
Catclaw	*Acacia greggii*	NT
Fairy duster	*Calliandra eriophylla**	NS
Blue paloverde	*Cercidium floridum*	NT
Silk dalea	*Dalea mollis*	PNF
Hairy lotus	*Lotus tomentellus*	ANF
Arizona lupine	*Lupinus arizonicus*	ANF
Desert ironwood	*Olneya tesota*	NT
Indigo bush	*Psorothamnus schottii*	NS
Smoke tree	*Psorothamnus spinosus [Dalea spinosa]*	NT
KRAMERIACEAE (Ratany)		
Ratany	*Krameria parvifolia*	NS
GERANIACEAE (Geranium)		
Large-flowered stork's bill	*Erodium texanum*	ANF[2]
ZYGOPHYLLACEAE (Caltrop)		
Fagonia	*Fagonia laevis*	NHS
Creosote bush	*Larrea tridentata*	NS
Puncture vine	*Tribulus terrestris*	AIF
EUPHORBIACEAE (Spurge)		
--	*Ditaxis neomexicana*	--
Sonoran sand mat	*Euphorbia [Chamaesyce] micromera*	ANF
BUXACEAE (Box)		
Jojoba	*Simmondsia chinensis*	NS
MALVACEAE (Mallow)		
Lantern flower, Desert five spot	*Eremalche rotundifolia*	ANF
Rock hibiscus	*Hibiscus denudatus*	NS
TAMARICACEAE (Tamarix)		
Salt cedar	*Tamarix chinensis*	IT

TABLE 2.3

PLANT SPECIES OBSERVED AT THE PROPOSED MESQUITE ARID LANDFILL STUDY SITE

Common Name	Scientific Name	Plant Characteristics[1]
CUCURBITACEAE (Gourds)		
Brandega gourd	*Brandegea bigelovii*	PNF
ONAGRACEAE (Evening Primrose)		
Yellow cups	*Camissonia brevipes*	ANF
Primrose	*Camissonia clavaeformis*	ANF
Brown-eyed primrose	*Camissonia clavaeformis* var. *aurantica*	ANF
Desert primrose	*Camissonia decorticans desertorum*	ANF
ASCLEPIADACEAE (Milkweed)		
Desert milkweed	*Asclepias subulata*	NHS
Rambling milkweed	*Sarcostemma hirtellum*	NWV
POLEMONIACEAE (Phlox)		
Broad-leafed gilia	*Gilia latifolia*	ANF
Bristly langloisia	*Langloisia setosissima*	ANF
FOUQUIERIACEAE (Ocotillo)		
Coach whip	*Fouquieria splendens*	NS
HYDROPHYLLACEAE (Water Leaf)		
Purple mat	*Nama demissum*	ANF
Crennulated phacelia	*Phacelia crenulata*	ANF
Ambiguous phacelia	*Phacelia ambigua*	ANF
Minute-flower phacelia	*Phacelia microflora*	ANF
--	*Phacelia pachyphylla*	ANF
BORAGINACEAE (Borage)		
Narrow-leaved cryptantha	*Cryptantha angustifolia*	ANF
Bearded cryptantha	*Cryptantha barbigera*	ANF
Ribbed cryptantha	*Cryptantha costata**	ANF
Maritime cryptantha	*Cryptantha maritima*	ANF
Soft-haired comb-nut, comb bur	*Pectocarya penicillata*	ANF
LABIATAE (LAMIACEAE) (Mint)		
Desert lavender	*Hyptis emoryi*	NS

TABLE 2.4

PLANT SPECIES OBSERVED AT THE PROPOSED MESQUITE ARID LANDFILL STUDY SITE

Common Name	Scientific Name	Plant Characteristics[1]
SOLANACEAE (Potato, nightshade)		
Desert thorn apple	*Datura discolor*	ANF
Anderson thornbush	*Lycium andersonii*	NS
Narrow-leaved thornbush	*Lycium andersonii* var. *deserticola*	NS
SCROPHULARIACEAE (--)		
Ghost flower	*Mohavea confertiflora*	ANF
OROBANCHACEAE (Broom Rape)		
Burro weed strangler	*Orobanche ludoviciana*	PNP2F
PLANTAGINACEAE (Plantain)		
Wooly plantain	*Plantago insularis* var. *fastigiata*	ANF
CAMPANULACEAE (Bellflower)		
Bellflower	*Nemacladus rubescens*	ANF
COMPOSITAE (*ASTERACEAE*) (Sunflower)		
White bursage	*Ambrosia dumosa*	NS
Sweet bush, Chuckawalla's delight	*Bebbia juncea*	NS
Pebble pincushion	*Chaenactis carphoclinia*	ANF
Esteve pincushion	*Chaenactis stevioides*	ANF
Brittle bush	*Encelia farinosa*	NS
Hairy-headed sunflower	*Geraea canescens*	ANF
Cheesebush (Burro brush)	*Hymenoclea salsola*	NS
California dandelion	*Malacothrix californica*	ANF
Desert dandelion	*Malacothrix glabrata*	ANF
Mohave desert star	*Monoptilon bellioides*	ANF
Spanish needle	*Palafoxia linearis*	ANF
Emory rock daisy	*Perityle emoryi*	ANF
Odora	*Porophyllum gracile*	NHS
Desert velvet, Velvet rosette	*Psathyrotes ramosissima*	ANF
Desert chicory	*Rafinesquia neomexicana*	ANF
Annual sow thistle	*Sonchus oleraceus*	AIF
Desert straw	*Stephanomeria pauciflora*	PNF

TABLE 2.5

PLANT SPECIES OBSERVED AT THE PROPOSED
MESQUITE ARID LANDFILL STUDY SITE

Common Name	Scientific Name	Plant Characteristics[1]
GRAMINEAE (*POACEAE*) (Grass)		
California three-awn	*Aristida californica*	PNG
Wild oat	*Avena fatua*	AIG
Big galleta	*Hilaria rigida*	PNG
Littleseed canary grass	*Phalaris minor*	AIG
Meditteranean grass	*Schismus barbatus*	AIG
TYPHACEAE (Cat-tail)		
Southern cat-tail	*Typha domingensis*	PNEF
VISCACEAE (Mistletoe)		
Desert mistletoe	*Phoradendron californicum*	--

[1]Shetler, S.G. and L.E. Skog, eds. 1978. A Provisional Checklist of Species for Flora North American. Missouri Botanical Garden.

KEY:			
	A: Annual	P2: Parasitic	F: Forb
	P: Perennial	S4: Succulent	G: Grass
	N: Native	E: Emergent	S: Shrub
	I: Introduced		T: Tree
			HS: Half shrub
			WV: Woody vine

[2]Incorrect in Shetler and Skog.

*On the CDFG NDDA Special Plants List.

TABLE 3.1

PLANT SPECIES OF THE PROPOSED
MESQUITE REGIONAL LANDFILL STUDY SITE
AND ADJOINING AREAS

Common Name	Scientific Name	Univ Ariz Study 1992	Mes-quite Study Wier 1983	Final EIR/EA 1984	VCR Study 1987	Tor-toise Study Section 16 1992
POLYGONACEAE (Buckwheat)						
Brittle spine flower	*Chorizanthe brevicornu*	X				X
Corrugated spiny herb	*Chorizanthe corrugata*	X				X
Rigid spiny herb	*Chorizanthe rigida*	X	X	X		X
Skeleton weed	*Eriogonum deflexum*	X	X[1]	X[1]		X
Desert trumpet	*Eriogonum inflatum*	X				X
NYCTAGINACEAE (Four O'clock)						
Hairy sand verbena	*Abronia villosa*					X
Trailing four-o'clock	*Allionia incarnata*	X		X		
--	*Mirabilis bigelovii*	X				
--	*Mirabilis froebelii*					X
Long-lobed four-o'clock	*Mirabilis tenuiloba*					X
PORTULACACEAE (Portulaca)						
Desert pot herb	*Calandrinia ambigua*	X				
CHENOPODIACEAE (Goose foot)						
Desert holly	*Atriplex hymenelytra*	X				
Pigweed	*Chenopodium album*	X				
AMARANTHACEAE (Amaranth)						
--	*Amaranthus fimbriatus*					X
Oblong-leafed tidestrom	*Tidestromia oblongifolia*	X	X	X		
CACTACEAE (Cactus)						
Englemann and Bigelow	*Echinocactus polycephalus*	X[2]	X	X		X
Calico cactus	*Echinocereus engelmanii*				X	

TABLE 3.2

PLANT SPECIES OF THE PROPOSED
MESQUITE REGIONAL LANDFILL STUDY SITE
AND ADJOINING AREAS

Common Name	Scientific Name	Univ Ariz Study 1992	Mes-quite Study Wier 1983	Final EIR/EA 1984	VCR Study 1987	Tor-toise Study Section 16 1992
CACTACEAE (Cactus), continued						
Fishhook, Pin-cushion	*Mammillaria tetrancistra*	X		X		X
Buckhorn cholla	*Opuntia acanthocarpa*	X				
Beavertail	*Opuntia basilaris*	X	X	X	X	X
Teddy bear cholla	*Opuntia bigelovii*	X	X	X	X	
Silver, golden cholla	*Opuntia echinocarpa*	X[2]	X	X	X	
Diamond cholla	*Opuntia ramosissima*	X		X		X
PAPAVERACEAE (Poppy)						
Desert gold poppy	*Eschscholzia glyptosperma*					X
Minute flowered desert poppy, Little gold poppy	*Eschscholzia minutiflora*	X				X
Parish poppy	*Eschscholtzia parishii*	X				
CRUCIFERAE (BRASSICACEAE) (Mustard)						
Black mustard	*Brassica nigra*	X				X[1]
Pepper grass	*Lepidium dictyotum*	X				
Desert alyssum	*Lepidium fremontii*					X
Bladder pod	*Lesquerella palmeri*	X				
London rocket	*Sisymbrium irio*	X				
Long-beaked twist flower	*Streptanthella longirostris*					X
RESEDACEAE (Mignonette)						
Narrow-leafed cambess	*Oligomeris linifolia*	X	X	X		X
ROSACEAE (Rose)						
Desert range almond	*Prunus fasciculata*	X	X	X		

TABLE 3.3

PLANT SPECIES OF THE PROPOSED MESQUITE REGIONAL LANDFILL STUDY SITE AND ADJOINING AREAS

Common Name	Scientific Name	Univ Ariz Study 1992	Mesquite Study Wier 1983	Final EIR/EA 1984	VCR Study 1987	Tortoise Study Section 16 1992
LEGUMINOSAE (FABACEAE) (Pea)						
Catclaw	*Acacia greggii*	X			X	
Fairy duster	*Calliandra eriophylla*	X	X	X	X	X
Blue paloverde	*Cercidium floridum*	X	X	X	X	X
California dalea	*Dalea california*	X[2]			X	
Silk dalea	*Dalea mollis*	X				
Hairy lotus	*Lotus tomentellus*	X				X
Arizona lupine	*Lupinus arizonicus*	X				X[1]
Desert ironwood	*Olneya tesota*	X	X	X	X	X
Indigo bush	*Psorothamnus schottii*	X			X	
Honey mesquite	*Prosopis glandulosa var. torreyana*	X[2]			X	
Smoke tree	*Psorothamnus spinosus [Dalea spinosa]*	X			X	X
KRAMERIACEAE (Ratany)						
Ratany	*Krameria parvifolia*	X	X[1]	X[1]		X[1]
GERANIACEAE (Geranium)						
Large-flowered stork's bill	*Erodium texanum*	X				X
ZYGOPHYLLACEAE (Caltrop)						
Fagonia	*Fagonia laevis*	X	X	X		X[3]
Creosote bush	*Larrea tridentata*	X	X	X	X	X
Puncture vine	*Tribulus terrestris*	X				
EUPHORBIACEAE (Spurge)						
--	*Ditaxis neomexicana*	X				
Rattlesnake weed	*Euphorbia albomarginata*					X
Sonoran sand mat	*Euphorbia [Chamaesyce]*[4] *micromera*	X				

TABLE 3.4

PLANT SPECIES OF THE PROPOSED
MESQUITE REGIONAL LANDFILL STUDY SITE
AND ADJOINING AREAS

Common Name	Scientific Name	Univ Ariz Study 1992	Mesquite Study Wier 1983	Final EIR/EA 1984	VCR Study 1987	Tortoise Study Section 16 1992
BUXACEAE (Box)						
Jojoba	*Simmondsia chinensis*	X				X
MALVACEAE (Mallow)						
Lantern flower, desert five spot	*Eremalche rotundifolia*	X	X	X		X[5]
Rock hibiscus	*Hibiscus denudatus*	X				
Desert mallow	*Sphaeralcea ambigua*				X	X[1]
TAMARICACEAE (Tamarix)						
Salt cedar	*Tamarix chinensis*	X	X[1]	X[1]		X[1]
LOASACEAE (Stick leaf)						
Blazing star	*Mentzelia* sp.					X[1]
BIGNONIACEAE (Bignonia)						
Desert catalpa	*Chilopsis linearis*	X[2]			X	
CUCURBITACEAE (Gourds)						
Brandega gourd	*Brandegea bigelovii*	X				
ONAGRACEAE (Evening Primrose)						
Booth primrose	*Camissonia boothii**					X
Yellow cups	*Camissonia brevipes*	X				
Primrose	*Camissonia clavaeformis*	X				
Brown-eyed primrose	*Camissonia clavaeformis* var. *aurantica*	X				
Desert primrose	*Camissonia decorticans desertorum**	X				
--	*Camissonia* sp.		X[1]	X[1]		X[1]
ASCLEPIADACEAE (Milkweed)						
Desert milkweed	*Asclepias subulata*	X				
Rambling milkweed	*Sarcostemma hirtellum*	X				X[1]

TABLE 3.5

PLANT SPECIES OF THE PROPOSED
MESQUITE REGIONAL LANDFILL STUDY SITE
AND ADJOINING AREAS

Common Name	Scientific Name	Univ Ariz Study 1992	Mesquite Study Wier 1983	Final EIR/EA 1984	VCR Study 1987	Tortoise Study Section 16 1992
POLEMONIACEAE (Phlox)						
Broad-leafed gilia	*Gilia latifolia*	X				
Purple phlox	*Gilia mathewsii*					X
Bristly langloisia	*Langloisia setosissima*	X	X[1]	X[1]		
FOUQUIERIACEAE (Ocotillo)						
Coach whip	*Fouquieria splendens*	X	X	X	X	X
HYDROPHYLLACEAE (Water Leaf)						
Purple mat	*Nama demissum*	X				X
Crennulated phacelia	*Phacelia crenulata*	X				X
Ambiguous phacelia	*Phacelia ambigua*	X				
Minute-flower phacelia	*Phacelia microflora*	X				
--	*Phacelia hemantii*					X
--	*Phacelia pachyphylla*	X				X
--	*Phacelia* sp.		X[1]	X[1]		
BORAGINACEAE (Borage)						
Narrow-leaved cryptantha	*Cryptantha angustifolia*	X				
Bearded cryptantha	*Cryptantha barbigera*	X				
Ribbed cryptantha	*Cryptantha costata*	X				
Maritime cryptantha	*Cryptantha maritima*	X				
Nevada cryptantha	*Cryptantha nevadensis*					X
--	*Cryptantha* sp.		X[1]	X[1]		
Soft-haired comb-nut, comb bur	*Pectocarya penicillata*	X				
Arch-nutted comb bur	*Pectocarya recurvata*					X
LABIATAE (*LAMIACEAE*) (Mint)						
Desert lavender	*Hyptis emoryi*	X	X	X	X	X

TABLE 3.6

PLANT SPECIES OF THE PROPOSED
MESQUITE REGIONAL LANDFILL STUDY SITE
AND ADJOINING AREAS

Common Name	Scientific Name	Univ Ariz Study 1992	Mesquite Study Wier 1983	Final EIR/EA 1984	VCR Study 1987	Tortoise Study Section 16 1992
SOLANACEAE (Potato, nightshade)						
Desert thorn apple	*Datura discolor*	X				X
Anderson thornbush	*Lycium andersonii*	X		X	X	
Narrow-leaved thornbush	*Lycium andersonii* var. *deserticola*	X				
Frutilla	*Lycium brevipes*				X	
--	*Lycium* sp.		X[1]			X[1]
Desert tobacco	*Nicotiana trigonophylla*	X[2]	X	X		
SCROPHULARIACEAE (--)						
Ghost flower	*Mohavea confertiflora*	X				X
OROBANCHACEAE (Broom Rape)						
Burro weed strangler	*Orobanche ludoviciana cf. latiloba*	X				
PLANTAGINACEAE (Plantain)						
Wooly plantain	*Plantago insularis* var. *fastigiata*	X	X	X		X[1]
CAMPANULACEAE (Bellflower)						
Bellflower	*Nemacladus rubescens*	X				
COMPOSITAE (ASTERACEAE) (Sunflower)						
White bursage	*Ambrosia dumosa*	X	X		X	X
Desert broom	*Baccharis sergiloides*				X	
Sweet bush, Chuckawalla's delight	*Bebbia juncea*	X	X	X		
Pebble pincushion	*Chaenactis carphoclinia*	X				

TABLE 3.7

PLANT SPECIES OF THE PROPOSED
MESQUITE REGIONAL LANDFILL STUDY SITE
AND ADJOINING AREAS

Common Name	Scientific Name	Univ Ariz Study 1992	Mes-quite Study Wier 1983	Final EIR/EA 1984	VCR Study 1987	Tor-toise Study Section 16 1992
COMPOSITAE (ASTERACEAE)	(Sunflower), continued					
Fremont pincushion	*Chaenactis fremontii*					X
Esteve pincushion	*Chaenactis stevioides*	X				
--	*Chaenactis* sp.		X[1]	X[1]		X[1]
Brittle bush	*Encelia farinosa*	X	X	X	X	X
Rayless encelia	*Encelia frutescens*				X	
Wallace eriophyllum	*Eriophyllum wallacei*					X
Hairy-headed sunflower	*Geraea canescens*	X				
Cheesebush (Burro brush)	*Hymenoclea salsola*	X	X	X	X	X
California dandelion	*Malacothrix californica*	X				
Desert dandelion	*Malacothrix glabrata*	X				
--	*Malacothrix* sp.					X[1]
Mohave desert star	*Monoptilon bellioides*	X				
Spanish needle	*Palafoxia linearis*	X				X
Emory rock daisy	*Perityle emoryi*	X				
Arrowweed	*Pluchea sericea*	X[2]			X	
Odora	*Porophyllum gracile*	X				
Desert velvet, Velvet rosette	*Psathyrotes ramosissima*	X				X
Desert chicory	*Rafinesquia neomexicana*	X				X
Annual sow thistle	*Sonchus oleraceus*	X				
Desert Straw	*Stephanomeria pauciflora*	X		X		X
GRAMINEAE (POACEAE)	(Grass)					
California three-awn	*Aristida californica*	X				X[1]
Wild oat	*Avena fatua*	X				
Fescue	*Festuca* sp. (annual)		X[1]	X[1]		

TABLE 3.8

PLANT SPECIES OF THE PROPOSED
MESQUITE REGIONAL LANDFILL STUDY SITE
AND ADJOINING AREAS

Common Name	Scientific Name	Univ Ariz Study 1992	Mes-quite Study Wier 1983	Final EIR/EA 1984	VCR Study 1987	Tor-toise Study Section 16 1992
GRAMINEAE (POACEAE) (Grass), continued						
Big galleta	*Hilaria rigida*	X	X	X		X
Little seed canary grass	*Phalaris minor*	X				
Mediterranean grass	*Schismus barbatus*	X				X[1]
TYPHACEAE (Cat-tail)						
Southern cat-tail	*Typha domingensis*	X				
VISCACEAE (Mistletoe)						
Desert mistletoe	*Phoradendron californicum*	X				

*Note *Camissonia decorticans* is included by some in *C. boothii*.
[1]Identified only to genus.
[2]Observed by researchers on Mesquite Mine site prior to 1992 but not seen on area surveyed for this study.
[3]*Fagonia laevis* = *Fagonia chilensis*.
[4]Revision of taxomonic name.
[5]Reported as *Malvastrum rotundifolium*.

MAP

(Explanation for Figure 4)

Community A

- Geomorphology:

  Incised channels in older, varnished alluvium.

- Characteristic woody perennial wash plants:

  Cercidium floridium, Olneya tesota, Hyptis emoryi, Lycium andersonii, Mirabilis bigelovii, Sarcostemma hirtellum (Figure 5 and Figure 6).

- Characteristic birds in winter-spring

  Warblers, western tanager, ash-throated flycatcher, western fly-catcher, and other migrating upland and thicket species. Gnatcatchers prefer to nest in the lower dense thickets of *Cercidium*, phainopeplas are more common, as are thrashers and verdin in this community.

- Characteristic reptiles

  Possibly the *Sceloperus magister*.

- Characteristic mammals

  Possibly the *Neotoma albigula*.

Community B

- Geomorphology:

  Shallow, spreading channels: sheet flow.
  Aeolian silt, sand, and interaction with fluvial processes.

- Characteristic woody perennial wash plants:

  Olneya tesota; Cercidium floridum is uncommon
  Larrea tridentata, Encelia farinosa, Bebbia juncea, Hymenoclea salsola
  (Figure 7 and Figure 8).

- Characteristic birds

  Yellow-rumped warbler in winter-spring (creosote bush)
  Black-throated sparrow, verdin, black-tailed gnatcatcher (washes)

- Characteristic reptiles

  Whiptail is most abundant (especially under creosote bush).

- Characteristic mammals

  Dipodomys merriami (especially under creosote bush).

Figure 5. Photograph of Wash Vegetation with Ironwood and Paloverde Found in Section 15. Vegetation in large drainages has a higher structure and can be relatively dense as compared to the communities in surrounding topography.

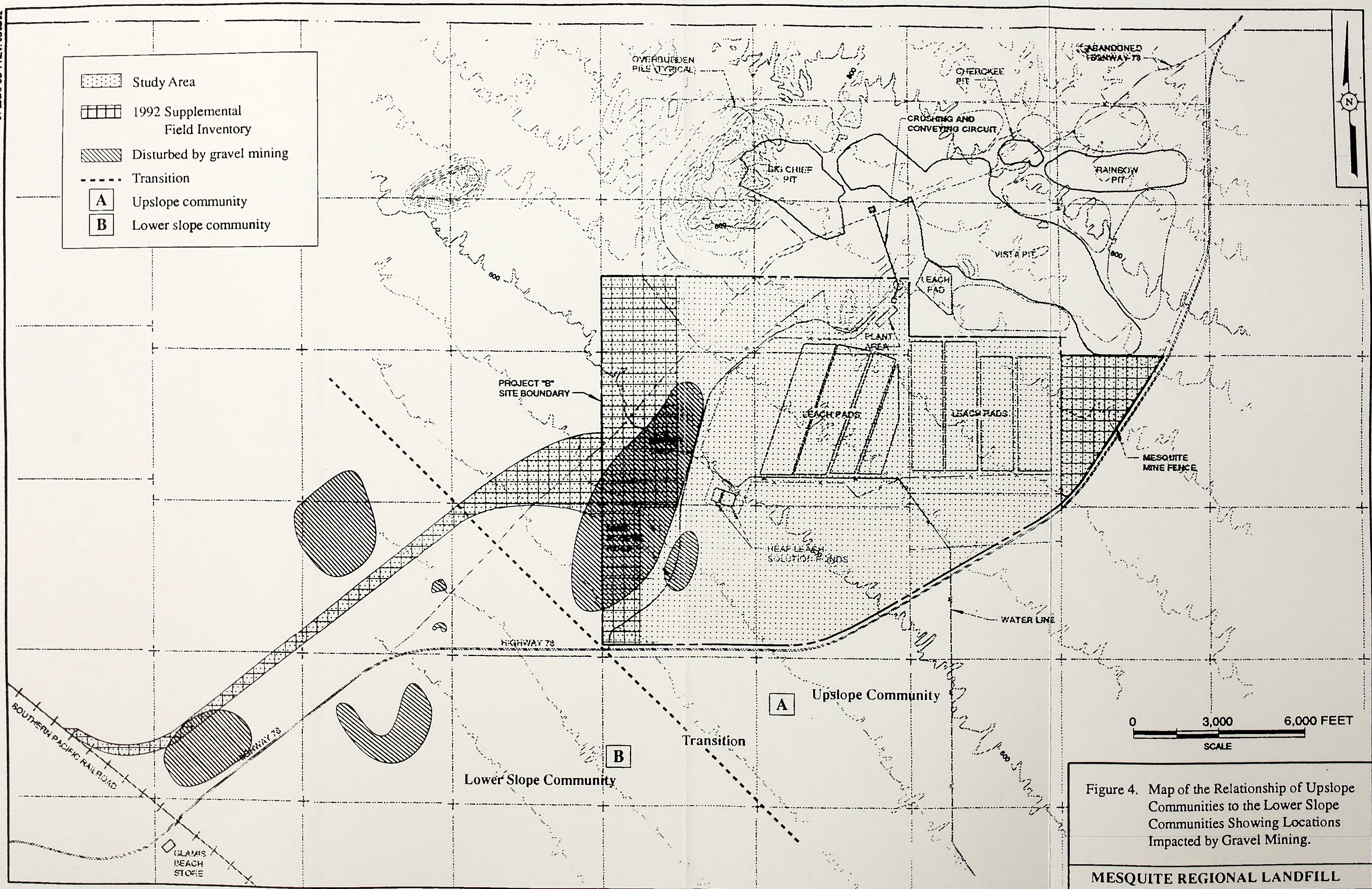

Figure 4. Map of the Relationship of Upslope Communities to the Lower Slope Communities Showing Locations Impacted by Gravel Mining.

MESQUITE REGIONAL LANDFILL

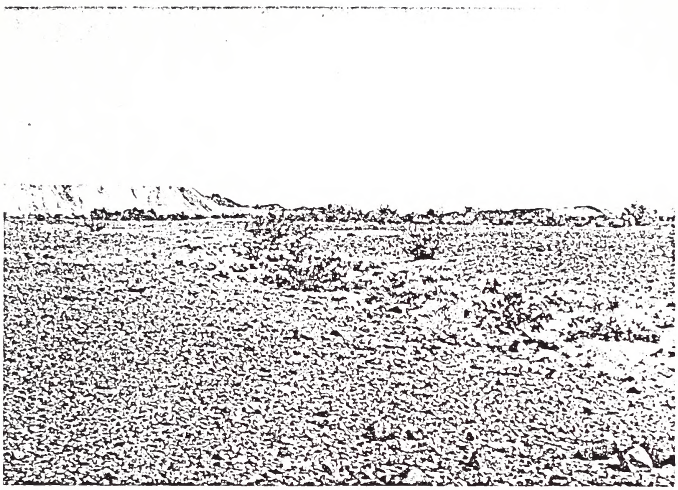

Figure 6. Photograph of Desert Varnished Pavement and Small Wash near the Mesquite Mine Boundary. This type of habitat is typical of much of the study area as well as surrounding areas.

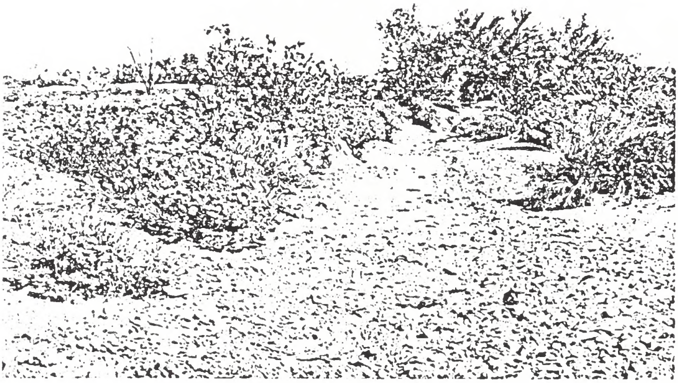

Figure 7. Photograph of Small Wash with Creosote Bush and Brittle Bush. This vegetation is typical of the washes in the alignment of the proposed railroad spur.

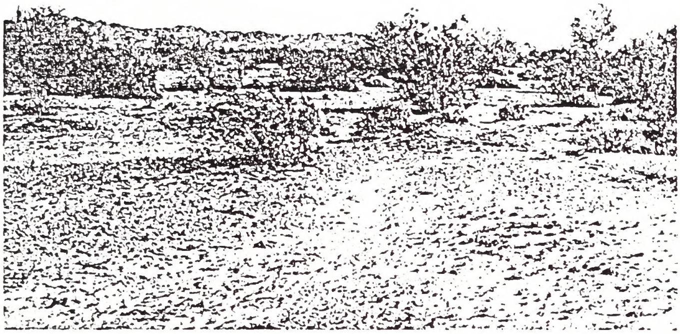

Figure 8. Photograph of Creosote Bush Scrub Near the Existing Railroad Line. This vegetation community covers the majority of the project site near the existing railroad line. Average cover is about 5 percent.

on transect data. Cover is concentrated in washes and along banks. The sandy areas near the railroad tend to have taller and bushier creosotes, especially where flow is detained at the protective dikes (Appendix B).

On the southern portion of the study area below about 500 feet (Community B), blue paloverde (*Cercidium floridum*) is scarce and desert ironwood (*Olneya tesota*) is the dominant obligate wash woody perennial. Creosote (*Larrea tridentata*) is the overall dominant woody perennial and it forms a frequent bank wash association with scattered white bursage (*Ambrosia dumosa*), cheesebush (*Hymenoclea salsola*), sweet bush (*Bebbia juncea*), and brittle bush (*Encelia farinosa*). Ratany (*Krameria parvifolia*) is more abundant in Community B than in Community A.

Annual Plants

During this wetter than normal year, annual cover this field season was exceptionally abundant and produced a particularly spectacular display of the annual flora. Rainfall for the first six months of 1992 recorded at the Mesquite Mine was about 7.5 inches: two times the expected annual precipitation. There is about a 30 percent chance of a year with almost 5 inches or more precipitation, based on the rainfall data above.

There is not a significant species difference seen in annual cover from upper to lower elevations; but annual plants are generally larger and have more developed inflorescences and herbage above 500 feet elevation in Community A.

Bearded cryptantha (*Cryptantha barbigera)* was found only in washes upslope (not on varnished pavement) and in fluviatile sand accumulations, usually under an ironwood or paloverde, in the southern portions of the study area. Ribbed cryptantha (*Cryptantha costata*), a NDDB special plant, was found in sandy fluvial deposits. *Phacelia* spp. tends to concentrate in washes. *Ditaxis neomexicana* was seen only in washes and channelled flow in sandy deposits. Annual plants that occur on pavements and looser sands are narrow-leafed cambess *(Oligomeris linifolia*), wooly plantain (*Plantago insularis*), large-flowered stork's bill (*Erodium texanum)* (scarce), *Camissonia* spp., narrow-leaved cryptantha (*Cryptantha angustifolia*), *Chorizanthe* spp., *Eriogonum* spp., Fagonia (*Fagonia laevis*), lantern flower (*Eremalche rotundifolia*), poppies (*Eschscholzia* spp.), pincushion (*Chaenactis* spp.), bristly langloisia (*Langloisia setosissima*), broad-leafed gilia (*Gilia latifolia*), and Mediterranean grass (*Schismus barbatus)*. Desert range almond (*Prunus fasciculata*) is unusual in its occurrence at such a low and dry sandy location. It may be a hold-over from an earlier moist period of establishment.

Plants found in disturbed areas include: salt cedar (*Tamarix chinensis*), annual sow thistle (*Sonchus oleraceus*), London rocket (*Sisymbrium irio*), pigweed (*Chenopodium album*), desert holly (*Atriplex hymenelytra*), and puncture vine (*Tribulus terrestris*).

Thus, the occurrence and community composition of woody perennials reflects the underlying physiographic characteristics seen as a result of gradient processes and climate history.

Figure 4 shows a map of the relationship of upslope Community A to the lower slope Community B. The entire site except the railroad spur is in the upslope community A. Characteristic species and geomorphology are summarized in the map description in Figure 4 (Page 31).

WILDLIFE AND WILDLIFE HABITAT

The wildlife habitat varies from almost undisturbed areas to extremely disturbed. Along State Highway 78 and away from the old alignment of State Highway 78, evidence of human disturbance includes: ongoing sand and gravel operations, ORV tracks, wind-blown debris, old metal and glass containers, and occasional firearm shell casings. The study area provides habitat for a diversity of small mammals, reptiles, and birds, especially in and adjacent to the major washes. The habitat and species represented at the site are typical of this region for similar elevations and drainage conditions.

Human Impacts within the Study Site

The major existing human impact to the 1992 Supplemental Field Inventory Study area results from gravel mining operations. These are seen on aerial photography as high-reflective white areas resulting from the loss of desert varnished pavement and vegetation. The areas of scraped surface and tractor tracks do not show revegetation of woody perennials. A recent drought period in which rainfall was only about 0.5 inches in 15 months and/or human changes of surface flow may be responsible for areas where perennials are dying. Salt cedar can be found in some areas where water is impounded. Figure 4 shows the location of gravel mining disturbance in relationship to the study area.

The eastern portion of the study area for the Mesquite Regional Landfill (Figure 2) is impacted by the active Mesquite Mine. Pits and waste dumps cover much of the proposed Mesquite Regional Landfill in this area.

The southern portion of the study site is impacted by off-road vehicles. These impacts are densest around Glamis and to the west. Associated with gravel mining and ORV use is wildcat dumping of non-perishable materials such as glass and metal cans, machine parts, and the like. Dumping is often associated with target shooting. Objects brought to the site are used as targets and are left behind after being shot up. Gravel berms make good back-drops for target shooting (BLM, 1993: written communication).

Firearm use is prevalent throughout the study area. A variety of shotgun shells and small arms and rifle casings from .22, .357, .38, .45 cal, 22 mag to 30 cal carbine and 50 cal and 20 mm (military) are found everywhere, but are most common around Glamis and the existing railroad line. On one occasion, small weapons fire curtailed some of our field activities since the direction of fire could not be determined.

Reptiles and Amphibians

Several species of lizards were seen during the survey period. The side-blotched lizard (*Uta stansburiana*), western whiptail and zebra-tailed lizards, (*Cnemidophorus tigris* and *Callisaurus draconoides*) and desert iguana (*Dipsosaurus dorsalis*) were widely distributed throughout the area (Table 4). The desert spiny lizard (*Sceloporus magister*) is especially dependent upon the presence of large ironwoods with shedding bark and crevices between broken branches and trunk and abundant litter beneath. All the lizards, except the

TABLE 4

REPTILE AND AMPHIBIAN SPECIES OBSERVED AT
THE PROPOSED MESQUITE REGIONAL LANDFILL STUDY SITE

Common Name	Scientific Name	Observed[1] Abundance	Means of Detection
TESTUDINIDAE (Land tortoises)			
Desert tortoise	*Gopherus [= Xerobates] agassizii*; ST, FT, FSS	Rare	Plastron, scat, burrows
IGUANIDAE (Iguanids)			
Zebra-tailed lizard	*Callisaurus draconoides*	Common	Observed
Desert iguana	*Dipsosaurus dorsalis*	Common	Observed
Desert spiny lizard	*Sceloporus magister*	Rare	Observed
Side-blotched lizard	*Uta stansburiana*	Very common	Observed
TEIIDAE (Whiptails)			
Western whiptail	*Cnemidophorus tigris*	Very common	Observed
COLUBRIDAE (Colubrids)			
Night snake	*Hypsiglena torquata*	--	Observed[2]
Spotted leaf-nosed snake	*Phyllorhynchus decurtatus*	--	Observed[2]
VIPERIDAE (Vipers)			
Western diamondback rattlesnake	*Crotalus atrox*	--	Observed

[1]Observed abundance was based on the relative number of observations of individuals and/or sign.
Rare - only a few individuals or sign present on study site.
Common - numerous individuals or sign observed.
Very common - the most numerous species or sign observed.

[2]Observed on paved highways near study site.

ST - State-listed threatened.
FT - Federally-listed threatened.
FSS - Federal (BLM and USFS) sensitive species.

western chuckwalla (*Sauromalus obesus*), utilized the diversity of habitat and food resources offered by up-slope stream channels. In the southern area (Community B), the western whiptail and desert iguana are characteristic species. The Supplemental Inventory Study area does not seem to have areas of ponding conducive to Couch's spadefoot toad (*Scaphiopus couchii*) or rock crevices for chuckwalla habitat. Couch's spadefoot toad has been seen in Purgatory Wash on the Mesquite Mine site (Karpiscak et al., 1991; Wier, 1983), and the chuckwalla has been observed on the Mesquite Mine site (Karpiscak et al., 1991). A total of 9 species of reptiles were found on the study site (Table 4) and some 24 species are known from the overall area based on team member sightings and review of other documents (Table 5).

The **Desert Tortoise** (*Gopherus [= Xerobates] agassizii*) is a long-lived species that has been the subject of great concern to resource agencies and is listed as threatened both by the state of California as well as the federal government. Signs of this species were observed throughout the overall study area during field work.

Birds

The Supplemental Inventory Study area provides wintering and nesting habitat to a diverse avifauna (Table 6). A list of some 50 birds seen in the overall area by OALS personnel and others is presented in Table 7. Most of the species listed utilize the dense and diverse structured canopies of the northern (upstream) reaches of the washes in the area of study (Community A). Such areas provide dense blue paloverde cover, tall and spreading ironwoods, and undershrubs along banks or scattered across widenings in the wash channels. Such undershrub consists of desert lavender (*Hyptis emoryi*), Lycium

TABLE 5.1

REPTILE AND AMPHIBIAN SPECIES OF THE PROPOSED MESQUITE REGIONAL LANDFILL STUDY SITE AND ADJOINING AREAS

Common Name	Scientific Name	Univ Ariz Study 1992	Mesquite Study Wier 1983	Final EIR/EA 1984	VCR Study 1987	Tortoise Study Section 16 1992
TESTUDINIDAE (Land tortoises)						
Desert tortoise	*Gopherus [= Xerobates] agassizii*	X	X[1]	X	X	X
GEKKONIDAE (Geckos)						
Western banded gecko	*Coleonyx variegatus*		X	X	X	X
IGUANIDAE (Iguanids)						
Zebra-tailed lizard	*Callisaurus draconoides*	X	X	X	X	X
Collared lizard	*Crotaphytus collaris*				X	
Desert iguana	*Dipsosaurus dorsalis*	X			X	X
Long-nosed leopard lizard	*Gambelia wislizenii*				X	
Southern desert-horned lizard	*Phrynosoma platyrhinos calidiarum*		X			X[2]
Western chuckwalla	*Sauromalus obesus*	X[3]	X	X	X	
Desert spiny lizard	*Sceloporus magister*	X	X	X		X
Desert fringe-toed lizard	*Uma notata*				X	
Long-tailed brush lizard	*Urosaurus graciosus*		X	X		X
Side-blotched lizard	*Uta stansburiana*	X	X	X		X
XANTUSIIDAE (Night lizards)						
Desert night lizard	*Xantusia vigilis*					X
TEIIDAE (Whiptails)						
Western whiptail	*Cnemidophorus tigris*	X	X	X	X	X

TABLE 5.2

REPTILE AND AMPHIBIAN SPECIES OF THE PROPOSED MESQUITE REGIONAL LANDFILL STUDY SITE AND ADJOINING AREAS

Common Name	Scientific Name	Univ Ariz Study 1992	Mes- quite Study Wier 1983	Final EIR/EA 1984	VCR Study 1987	Tor- toise Study Section 16 1992
COLUBRIDAE (Colubrids)						
Glossy snake	*Arizona elegans*				X	
Western shovel-nosed snake	*Chionactis occipitalis*				X	X[2]
Night snake	*Hypsiglena torquata*	X				
Coachwhip	*Masticophis flagellum*					X[2]
Spotted leaf-nosed snake	*Phyllorhynchus decurtatus*	X			X	
VIPERIDAE (Vipers)						
Western diamondback rattlesnake	*Crotalus atrox*	X				X[2]
Sidewinder	*Crotalus cerastes*			X	X	
Speckled rattlesnake	*Crotalus mitchellii*				X	
BUFONIDAE						
Red-spotted toad	*Bufo punctatus*		X	X		
PELOBATIDAE						
Couch's spadefoot toad	*Scaphiopus couchii*	X[3]	X	X		X[2]

[1]Scat only.
[2]Not confirmed identification as to species.
[3]Observed by researchers on Mesquite Mine site prior to 1992 but not seen on area surveyed for this study.

TABLE 6.1

BIRD SPECIES OBSERVED AT THE PROPOSED MESQUITE REGIONAL LANDFILL STUDY SITE

Common Name	Scientific Name
CATHARTIDAE (American vultures)	
Turkey vulture	*Cathartes aura*[2]
ACCIPITRIDAE (Hawks)	
Red-tailed hawk	*Buteo jamaicensis*[4]
Ferruginous hawk	*Buteo regalis*; CSC,2[4]
FALCONIDAE (Falcons)	
American kestrel	*Falco sparverius*[4]
CHARADRIIDAE (Plovers, turnstones, surfbirds)	
Killdeer	*Charadrius vociferus*[4]
COLUMBIDAE (Pigeons, doves)	
Mourning dove	*Zenaida macroura*[2]
CUCULIDAE (cuckoos)	
Greater roadrunner	*Geococcyx californicus*[2]
CAPRIMULGIDAE (Goat suckers)	
Lesser nighthawk	*Chordeiles acutipennis*[2]
TROCHILIDAE (Hummingbirds)	
Anna's hummingbird	*Calypte anna*[3]
Costa's hummingbird	*Calypte costae*[2]
TYRRANNIDAE (Tyrant flycatchers)	
Western flycatcher	*Empidonax difficilis*[4]
Ash-throated flycatcher	*Myiarchus cinerascens*[2]
ALAUDIDAE (Larks)	
Horned lark	*Eremophila alpestris*[2,3]
CORVIDAE (Jays, magpies, crows)	
Common raven	*Corvus corax*[2]
REMIZIDAE (Titmice, verdins, bushtits)	
Verdin	*Auriparus flaviceps*[2]
TROGLODYTIDAE (Wrens)	
Cactus wren	*Campylorhyncus brunneicapillus*[2]
House wren	*Troglodytes aedon*[4]
MUSCICAPIDAE (Gnatcatchers, kinglets)	
Black-tailed gnatcatcher	*Polioptila melanura*; CSC[*1]
Black-capped gnatcatcher	*Polioptila nigriceps*[3,4]

TABLE 6.2

BIRD SPECIES OBSERVED AT THE PROPOSED
MESQUITE REGIONAL LANDFILL STUDY SITE

Common Name	Scientific Name
MIMIDAE (Mockingbirds, thrashers)	
Mockingbird	*Mimus polyglottos*[2,3]
Sage thrasher	*Oreoscoptes montanus*[4]
Bendire's thrasher	*Toxostoma bendirei*; CSC*[3]
Le Conte's thrasher	*Toxostoma lecontei*[2]
PTILOGONATIDAE (Silky flycatchers)	
Phainopepla	*Phainopepla nitens*[1]
LANIIDAE (Shrikes)	
Loggerhead shrike	*Lanius ludovicianus*[2,3]
EMBERIZIDAE (Wood warblers, orioles, tanagers, grosbeaks, sparrows)	
Black-throated sparrow	*Amphispiza bilineata*[2]
Yellow-rumped warbler (Audubon's)	*Dendroica coronata*[4]
Black-throated gray warbler	*Dendroica nigrescens*[4]
Sonora yellow warbler	*Dendroica petechia sonorana*; CSC*[3]
Gray-headed junco	*Junco hyemalis caniceps*; CSC*[4]
Western tanager	*Piranga ludoviciana*[4]
Vesper sparrow	*Pooecetes gramineus*[4]
Nashville warbler	*Vermivora ruficapilla*[4]
Virginia's warbler	*Vermivora virginiae*; CSC*[4]
Wilson's warbler	*Wilsonia pusilla*[4]
White-crowned sparrow	*Zonotrichia leucophrys*[4]
FRINGILLIDAE (Finches)	
House finch	*Carpodacus mexicanus*[4]

CSC - California Department of Fish and Game "Species of Special Concern."
FE - Federal Endangered.
SE - State Endangered (California).
2 - Category 2 candidate for federal listing (Taxa which existing information indicates may warrant listing, but for which substantial biological information to support a proposed rule is lacking).

Of these species, the gnatcatchers, verdin, black-throated sparrow, mourning dove, Gambel's quail, turkey vulture, raven, and possibly mocking bird and shrike, horned lark, and lesser night hawk would be found through summer.

* On California Department of Fish and Game NDDB (Natural Diversity Data Base) list.
[1]Observed nesting on site.
[2]Resident to mostly resident.
[3]Probably transient.
[4]Transient or visitant.

TABLE 7.1

BIRD SPECIES OF THE PROPOSED MESQUITE REGIONAL LANDFILL STUDY SITE AND ADJOINING AREAS

Common Name	Scientific Name	Univ Ariz Study 1992	Mesquite Study Wier 1983	Final EIR/EA 1984	VCR Study 1987	Tortoise Study Section 16 1992
CATHARTIDAE (American vultures)						
Turkey vulture	*Cathartes aura*	X	X	X		X
ACCIPITRIDAE (Hawks)						
Red-tailed hawk	*Buteo jamaicensis*	X[1]		X[2]	X	
Ferruginous hawk	*Buteo regalis*	X				
Osprey	*Pandion haliaetus*					X
FALCONIDAE (Falcons)						
American kestral	*Falco sparverius*	X				X
PHASIANIDAE (Quails, partridges, pheasants)						
Gambel's quail	*Callipepla gambelii*	X[1,3]	X	X		
CHARADRIIDAE (Plovers, turnstones, surfbirds)						
Killdeer	*Charadrius vociferus*	X				
COLUMBIDAE (Pigeons, doves)						
Common ground dove	*Columbina passerina*				X	
White-winged dove	*Zenaida asiatica*				X	
Mourning dove	*Zenaida macroura*	X	X	X	X	X
CUCULIDAE (Cuckoos)						
Greater roadrunner	*Geococcyx californicus*	X[1]				
TYTONIDAE (Barn owls)						
Barn owl	*Tyto alba*		X	X	X	
CAPRIMULGIDAE (Goatsuckers)						
Lesser nighthawk	*Chordeiles acutipennis*	X	X	X		X
TROCHILIDAE (Hummingbirds)						
Anna's hummingbird	*Calypte anna*	X				
Costa's hummingbird	*Calypte costae*	X	X	X		

TABLE 7.2

BIRD SPECIES OF THE PROPOSED
MESQUITE REGIONAL LANDFILL STUDY SITE
AND ADJOINING AREAS

Common Name	Scientific Name	Univ Ariz Study 1992	Mesquite Study Wier 1983	Final EIR/EA 1984	VCR Study 1987	Tortoise Study Section 16 1992
TYRANNIDAE (Tyrant flycatchers)						
Western flycatcher	*Empidonax difficilis*	X				
Ash-throated flycatcher	*Myiarchus cinerascens*	X	X	X		
Say's phoebe	*Sayornis saya*				X	X
Western kingbird	*Tyrannus verticalis*					X
ALAUDIDAE (Larks)						
Horned lark	*Eremophila alpestris*	X				X
HIRUNDINIDAE (Swallows)						
Barn swallow	*Hirundo rustica*		X	X		
Northern rough-winged swallow	*Stelgidopteryx serripennis*				X	
CORVIDAE (Jays, magpies, crows)						
Common raven	*Corvus corax*	X	X[2]	X[2]		X
REMIZIDAE (Titmice, verdins, bushtits)						
Verdin	*Auriparus flaviceps*	X[2]	X[2]	X[2]	X	
TROGLODYTIDAE (Wrens)						
Cactus wren	*Campylorhynchus brunneicapillus*	X[1]	X	X		
House wren	*Troglodytes aedon*	X				
Wren sp.	--					X[4]
MUSCICAPIDAE (Gnatcatchers, kinglets)						
Black-tailed gnatcatcher	*Polioptila melanura*	X[2]	X	X	X	
Black-capped gnatcatcher	*Polioptila nigriceps*	X				X

TABLE 7.3

BIRD SPECIES OF THE PROPOSED MESQUITE REGIONAL LANDFILL STUDY SITE AND ADJOINING AREAS

Common Name	Scientific Name	Univ Ariz Study 1992	Mesquite Study Wier 1983	Final EIR/EA 1984	VCR Study 1987	Tortoise Study Section 16 1992
MIMIDAE (Mockingbirds, thrashers)						
Mockingbird	*Mimus polyglottos*	X				X
Sage thrasher	*Oreoscoptes montanus*	X				
Bendire's thrasher	*Toxostoma bendirei*	X				
Le Conte's thrasher	*Toxostoma lecontei*	X[1]			X	
PTILOGONATIDAE (Silky flycatchers)						
Phainopepla	*Phainopepla nitens*	X[2]	X[5]	X		X
LANIIDAE (Shrikes)						
Loggerhead shrike	*Lanius ludovicianus*	X	X	X		X[4]
EMBERIZIDAE (Wood warblers, orioles, tanagers, grosbeaks, sparrows)						
Black-throated sparrow	*Amphispiza bilineata*	X			X	X
Yellow-rumped warbler (Audubon's)	*Dendroica coronata*	X				
Black-throated gray warbler	*Dendroica nigrescens*	X				
Sonora yellow warbler	*Dendroica petechia sonorana*	X				
Hooded oriole	*Icterus cucullatus*				X	
Northern oriole (Baltimore)	*Icterus galbula galbula*					X
Scott's oriole	*Icterus parisorum*		X	X		
Gray-headed junco	*Junco hyemalis caniceps*	X				
Black-headed grosbeak	*Pheucticus melanocephalus*			X		X
Western tanager	*Piranga ludoviciana*	X				
Vesper sparrow	*Pooecetes gramineus*	X				
Nashville warbler	*Vermivora ruficapilla*	X		X		

TABLE 7.4

BIRD SPECIES OF THE PROPOSED
MESQUITE REGIONAL LANDFILL STUDY SITE
AND ADJOINING AREAS

Common Name	Scientific Name	Univ Ariz Study 1992	Mesquite Study Wier 1983	Final EIR/EA 1984	VCR Study 1987	Tortoise Study Section 16 1992
EMBERIZIDAE (cont.)						
Virginia's warbler	*Vermivora virginiae*	X				
Wilson's warbler	*Wilsonia pusilla*	X[6]				
White-crowned sparrow	*Zonotrichia leucophrys*	X				
FRINGILLIDAE (Finches)						
House finch	*Carpodacus mexicanus*	X				

[1]Birds seen in June 1993
[2]Nests observed.
[3]Observed by researchers on Mesquite Mine prior to 1992 but not seen on area surveyed for this study during 1992.
[4]Not confirmed indentification as to species.
[5]Perch observed only.
[6]Seen by researchers on Mesquite Mine prior to 1992 and also seen during the 1992 survey.

spp., jojoba (*Simmondsia chinensis*), and cat claw (*Acacia greggii).* Coach whip (*Fouqueria*) can occur in wide channels and on the outer high reaches of banks. Smoke trees (*Psorothamnus spinosus* [*Dalea spinosa*]) are uncommon. A dense association of annuals is found under ironwoods, paloverdes, and along banks.

As noted above, this year, 1992, 7.5 inches of rain was recorded at the Mesquite Mine station from December to June: about twice the annual average rainfall for the area. Consequently, the upstream habitats were a profusion of flowers, herbage, foliage, seeds and berries, as well as associated insects: gnats, mosquitos, flies, bees, sap-sucking bugs, beetles, ants, moths, butterflies, and caterpillars, providing food for birds. The species utilizing the dense foliage (blue paloverde and lycium thicket) for insect forage include the six species of warblers observed (Wilson's, Nashville, Virginia's, yellow, yellow-rumped, and black-throated gray), the 2 species of gnatcatchers (black-tailed and black-capped), and verdin. The gnatcatchers and verdin also use the whole height of the ironwood. Although the sighting of the black-capped gnatcatcher is considered unusual for the area, both the OALS team as well as personnel from the Tortoise Study made the same observation in the same general area.

Insectivorous species favoring the upper perches and canopy are the ash-throated flycatcher, phainopepla, mockingbird, and loggerhead shrike.

Species mostly using more open to lower mid-canopy insect resources are the western flycatchers, western tanager, ash-throated flycatcher and mocking bird. The sage thrasher and Bendire's thrasher perch on low to middle level branches.

The sage and Bendire's thrashers use the ground for insect forage. The lesser nighthawk nests on the ground, but flies over the canopy for insects, as well as over open ground. The greater roadrunner exploits ground cover and lower tree level resources.

In the downstream reaches (Community B), bird diversity drops as the habitat thins. Blue paloverde is occasional, and bank shrubbery (non-creosote) thins and eventually disappears as elevation decreases. Ironwoods are scattered with a structure of living and dead branches forming an understory, and tall living or dead branches providing forage areas and perches. Insectivorous species in these habitats include the verdin, black-tailed gnatcatcher, black-throated sparrow, occasional phainopepla and mockingbird. Of the warblers, only the yellow-rumped warbler was observed utilizing the creosote scrub and the larger creosotes near washes. The loggerhead shrike also is found sparsely in the sparse wash areas.

The mourning dove was seen mostly in the upstream areas (Community A), as were the house finches, vesper sparrows, Bendire's and the sage thrashers, Anna's and Costa's hummingbird, the white-crowned sparrow, gray-headed junco and black-capped gnatcatcher. The gray-headed junco especially enjoyed the benefit of bank scrub tangle, abundant Lycium, and mistletoe berries. The white-crowned sparrow particularly likes the seeds of narrow-leafed cambess *(Oligomeris linifolia)*, as well as aphids and caterpillars.

The horned lark was seen in both the Community A and Community B. It was seen particularly to use the open interfluvial spaces. Killdeer were seen where detention pools had formed near gravel operations and in clayey depressions by roadside.

Ravens and vultures circled high over the site. The kestrel was seen to perch on tall ironwood. A ferruginous hawk was sighted.

Flowers and fleshy fruits were also abundant this year as a result of the abnormally high precipitation. Fallen fruits provide food for thrasher, quail, and black-throated sparrows as well as for mockingbirds and phainopeplas, and the sage thrasher. Flowers provide food and moisture for hummingbirds and finches.

The transient and visiting avifauna are most diverse in Community A.

The permanent bird population consists of black-tailed gnatcatcher, verdin, black-throated sparrow, turkey vulture, raven; and probably the greater roadrunner, cactus wren, Le Conte's thrasher, loggerhead shrike, mourning dove, horned lark, and Gambel's quail. Although these birds may move eastward to more favorable habitats during summer when foliage is sparse, they have been observed on-site through the end of June. The lesser nighthawk could possibly remain on-site through winter if winters are mild. These permanent species are mostly common in Community A.

The winter species are the six species of warbler, western tanager, phainopepla, mockingbird, western flycatcher, Bendire's thrasher, sage thrasher, white crowned sparrow, grey headed junco, vesper sparrow, Anna's and Costa's hummingbirds, and house finches. These species, except Costa's hummingbird, phainopepla, and mockingbird are transient migrants. Costa's hummingbird, phainopepla, and mockingbird probably are winter residents.

Quail and the mourning dove may remain on or near the site throughout the year because of the presence of water at nearby (four stations within 3 to 6 miles) CDFG bighorn sheep/deer watering stations (guzzlers), several ephermal ponds, depressions, and occasionally water at the mine site. This is especially true during 1992 with the above average precipitation.

Nests have been seen for black-tailed gnatcatcher, verdin, and phainopepla (fledglings in nest). Some old, unidentified nests were also seen. Costa's hummingbird may have been nesting based on a female Costa's behavior. The black-tailed gnatcatcher was observed sitting on a nest and young fledglings were seen in other washes on-site.

Lower Colorado River Valley and Bird Migrations

The Lower Colorado River Valley and Colorado Desert are perhaps the most important features for the migration of birds to and from Mexico (Small, 1974; Rosenberg et al., 1991). Land bird migrants typically will follow the Colorado River Valley northward and then cross the Mohave Desert. However, the appearance of dense foliage with heavy rain can attract migrating birds through the Colorado Desert. During the period December 1991 through May 1992, the site had high rainfall. As a result, the upslope wash communities presented dense and inviting habitats for birds to follow along the mountain front middle-upper bajadas. This migratory path leads to the extensive artificial oases (agricultural areas) of the Coachella and Imperial Valleys, and to the transverse ranges, thus skirting the Mohave Desert.

This path of migration from the Lower Colorado River Valley (LCRV) along the scattered-bush upper-bajada wash thickets accounts for the many transient or visitant species found on-site. Since the 1980s, ferruginous hawks have become increasingly sighted around Blythe (Rosenberg et al., 1991). In a year such as this, it would be attractive for a ferruginous hawk to follow the more open thicket country along the western mountain margins going westward up the Colorado Desert. Because of the observed but unexplained trend for ferruginous hawks to winter in greater numbers in the LCRV, the study region may become increasingly visited as a wintering resource by these hawks. Also, the open terrain is more conducive to ferruginous hawks which tend to perch on the ground more than the red-tailed hawk (Rosenberg et al., 1991). Some transient migratory species have previously been reported as using the area: the Nashville warbler and Wilson's warbler have been reported in earlier field studies for the Mesquite Mine. This indicates that this section of the Colorado Desert is a repeatedly-visited or utilized habitat for species associated with wintering in the LCRV.

Species sighted in other reports in the study site vicinity, such as Say's phoebe, western kingbird, northern rough-winged swallow, Scott's oriole, northern oriole, and osprey, indicate this study area is visited or is a path of migration for birds associated with LCRV resource use.

The Colorado Desert is an important breeding and habitat refuge for birds suffering from population declines in other perennial riparian habitats such as the LCRV, Coachella, and the Imperial Valley (Rosenberg et al., 1991; Remsen, 1978). Population declines for some birds result from habitat loss and brown cowbird nest parasitism. Two such species are the black-tailed gnatcatcher and the Sonoran yellow warbler. The success of the black-tailed gnatcatcher is seen to rely on peripheral Colorado Desert populations where cowbird parasitism is less common than in the perennial riparian environments (Rosenberg, et al., 1991). The Sonoran yellow warbler disappeared from the LCRV in 1955 as a result of the combination of habitat loss and cowbird parasitism. Now the population must rely on the success of peripheral breeding populations (Rosenberg, et al., 1991). The Mesquite site, however, does not provide breeding habitat for the Sonoran yellow warbler but does provide breeding habitat for the black-tailed gnatcatcher. The Colorado Desert does provide refuge habitat when winter temperatures become too extreme in the LCRV drainage and elsewhere.

The study area is a small part of a valuable resource in preserving the continuity of Colorado Desert habitat. This area is typical of the Lower Colorado Subdivision of the Sonoran Desert in California.

The house sparrow (*Passer domesticus*) was observed at the Glamis "beach store" and at the Mesquite Mine. This remarkably successful intrusive bird is a potential invasive species into the surrounding undisturbed habitat.

<u>Mammals</u>

Nineteen mammal species were found to be present on the Supplemental Field Inventory study site by OALS personnel (Table 8). Two additional species were reported by others on adjacent sites (Mesquite Mine) which would

TABLE 8.1

MAMMAL SPECIES OBSERVED AT THE PROPOSED MESQUITE REGIONAL LANDFILL STUDY SITE

Common Name	Scientific Name	Means of Detection
LEPORIDAE (Rabbits and hares)		
Black-tailed jackrabbit	*Lepus californicus*	Observed, scat, tracks
Desert cottontail	*Sylvilagus auduboni*	Observed, scat, tracks
SCIURIDAE (Squirrels and relatives)		
White-tailed antelope squirrel	*Ammospermophilus leucurus*	Observed
HETEROMYIDAE (Kangaroo rats, pocket mice)		
Merriam kangaroo rat	*Dipodomys merriami*	Trapped
Bailey pocket mouse	*Perognathus baileyi*	Trapped
Long-tailed pocket mouse	*Perognathus formosus*	Trapped
Little pocket mouse	*Perognathus longimembris*	Trapped
Desert pocket mouse	*Perognathus penicillatus*	Trapped
Spiny pocket mouse	*Perognathus spinatus*	Trapped
CRICETIDAE (Mice, rats)		
Colorado Valley woodrat	*Neotoma albigula venusta**	Trapped, midden, scat
Desert woodrat	*Neotoma lepida*	Trapped, midden, scat
CANIDAE (Foxes, coyotes)		
Coyote	*Canis latrans*	Skull, scat, tracks
Gray fox	*Urocyon cinereoargenteus*	Scat, tracks
Kit fox	*Vulpes macrotis*	Observed, den, scat, tracks
FELIDAE (Cats and relatives)		
Bobcat	*Lynx rufus*	Tracks
CERVIDAE (Deer)		
Mule deer	*Odocoileus hemionus*	Observed, scat, tracks

TABLE 8.2

MAMMAL SPECIES OBSERVED AT THE PROPOSED MESQUITE REGIONAL LANDFILL STUDY SITE

Common Name	Scientific Name	Means of Detection
BOVIDAE (Sheep and relatives)		
Nelson's bighorn sheep	*Ovis canadensis nelsoni**	Scat
MUSTELIDAE (Mustelids)		
Spotted skunk	*Spilogale putorius*	Tracks[1]
Badger	*Taxidea taxus*	Observed[2]

[1]Not confirmed identification as to species.
[2]Reported by Mesquite Mine personnel as "road kill" on access road to the main entrance of the Mesquite Mine.

*Listed on the CDFG NDDB Special Animals List as taxa that fall in one or more of the following categories:

- Taxa that are biologically rare, very restricted in distribution, or declining throughout their range.
- Population(s) in California that may be peripheral to the major portion of a taxon's range, but which are threatened with extirpation within California.
- Taxa closely associated with a habitat that is declining in California at an alarming rate (e.g., wetlands, riparian, old growth forests).

be part of the proposed landfill and one species was noted at Glamis by OALS personnel (Table 9). Kit fox scat, tracks, and dens were found. Badger was reported by mine personnel as a "road kill" on the access road to the Mesquite Mine. The most frequently-trapped mammal was the desert pocket mouse (Table 10) while the most frequently observed mammals were the black-tailed jackrabbit and mule deer. Appendix C contains data on the small mammal trapping conducted on the study area.

Nelson's bighorn sheep were recorded on-site by scat identification. Also, our team recorded an unconfirmed visual sighting and tracks in the dense wash thickets not far from the identified scat. Although it is difficult to distinguish between bighorn sheep scat and that of mule deer, the tracks and the unconfirmed sighting are good evidence, although not conclusive of the presence of this animal on-site. In good winter vegetation such as produced by this year's rainfall, the site could provide cover and browse for these elusive animals. The unusual heavy rains during the study period made it possible to easily detect recent animal activity; however, these rains also made it more difficult to find indications of past animal activity.

SPECIES OF INTEREST

The following section includes material on sensitive species observed on-site during the 1992 Supplemental Field Inventory and previous studies conducted for the Mesquite Mine. In addition, CDFG reported species for the general area are discussed. Sensitive species is a term used to designate threatened, endangered, rare, limited in distribution, or lacking sufficient

TABLE 9.1

MAMMAL SPECIES OF THE PROPOSED
MESQUITE REGIONAL LANDFILL STUDY SITE
AND ADJOINING AREAS

Common Name	Scientific Name	Univ Ariz Study 1992	Mesquite Study Wier 1983	Final EIR/EA 1984	VCR Study 1987	Tortoise Study Section 16 1992
LEPORIDAE (Rabbits and hares)						
Black-tailed jackrabbit	*Lepus californicus*	X	X	X	X	X
Desert cottontail	*Sylvilagus auduboni*	X	X	X		
SCIURIDAE (Squirrels and relatives)						
White-tailed antelope squirrel	*Ammospermophilus leucurus*	X	X	X		X[1]
Round-tailed ground squirrel	*Spermophilus tereticaudus*	X[2]				
HETEROMYIDAE (Kangaroo rats, pocket mice)						
Desert kangaroo rat	*Dipodomys deserti*				X	
Merriam kangaroo rat	*Dipodomys merriami*	X	X	X	X	
Bailey pocket mouse	*Perognathus baileyi*	X			X	
Long-tailed pocket mouse	*Perognathus formosus*	X	X	X		
Little pocket mouse	*Perognathus longimembris*	X				
Desert pocket mouse	*Perognathus penicillatus*	X	X	X	X	
Spiny pocket mouse	*Perognathus spinatus*	X	X	X	X	
CRICETIDAE (Mice, rats)						
Colorado Valley woodrat	*Neotoma albigula venusta*	X	X	X	X	X[1]
Desert woodrat	*Neotoma lepida*	X				

TABLE 9.2

MAMMAL SPECIES OF THE PROPOSED
MESQUITE REGIONAL LANDFILL STUDY SITE
AND ADJOINING AREAS

Common Name	Scientific Name	Univ Ariz Study 1992	Mesquite Study Wier 1983	Final EIR/EA 1984	VCR Study 1987	Tortoise Study Section 16 1992
CANIDAE (Foxes, coyotes)						
Coyote	*Canis latrans*	X	X	X	X	X
Gray fox	*Urocyon cinereoargenteus*	X		X		
Kit fox	*Vulpes macrotis*	X	X	X	X	X
FELIDAE (Cats and relatives)						
Bobcat	*Lynx rufus*	X				
CERVIDAE (Deer)						
Mule deer	*Odocoileus hemionus*	X		X	X	
BOVIDAE (Sheep and relatives)						
Nelson's bighorn sheep	*Ovis canadensis nelsoni*	X				X[3]
MUSTELIDAE (Mustelids)						
Spotted skunk	*Spilogale putorius*	X[1]			X	
Badger	*Taxidea taxus*	X[4]				X
CHIROPTERA (Bats)						
Bat	Unidentified		X	X		

[1]Not confirmed identification as to species.
[2]Observed off study site near Glamis, west of railroad tracks.
[3]Unconfirmed possible track questioned in team notes.
[4]Reported as "road kill" on access road to main entrance of the Mesquite Mine.

TABLE 10

SMALL MAMMAL TRAPPING RESULTS SUMMARY
AT THE PROPOSED MESQUITE REGIONAL LANDFILL*

Species Name		Number of Individuals Captured	Percent of Individuals Captured
Common	Scientific		
Merriam kangaroo rat	*Dipodomys merriami*	3	3.6
Baily pocket mouse	*Perognathus baileyi*	5	6.0
Long-tailed pocket mouse	*Perognathus formusus*	4	4.8
Little pocket mouse	*Perognathus longimembris*	1	1.2
Desert pocket mouse	*Perognathus penicillatus*	38	45.2
Spiny pocket mouse	*Perognathus spinatus*	9	10.7
White throat woodrat	*Neotoma albigula*	21	25.0
Desert woodrat	*Neotoma lepida*	3	3.6

* The total number of traps set during the study was 536 (68 + 68 + 100 + 50 + 50 + 50 + 50 + 50 + 50).

information to classify correctly. Designations are assigned by Federal or State agencies based on the available data.

It should be noted that the washes, especially in the upslope Community A, are the locus of species diversity, number, and biomass, providing habitat for listed sensitive and non-listed species of plants and animals.

ANIMAL SPECIES OBSERVED ON-SITE

Couch's spadefoot toad (*Scaphiopus couchii*) is listed on the CDFG (California Department of Fish and Game), NDDB (Natural Diversity Data Base) list of special animals with a CSC (species of special concern) status. This species has been observed in Purgatory Wash at the Mesquite Mine. It was not observed in the 1992 Supplemental Field Inventory study area. Ponding in areas resulting from human impacts to overland or wash flow can possibly create breeding sites for couch's spadefoot toad.

Noise frequencies from off-road vehicles and machinery can stimulate the spadefoot toad to emerge from its underground state of suspended animation during dry periods instead of during rain. The vehicular frequencies stimulate the rain and thunderstorm response of the toad. Such induced emergence leads to death for the spadefoot toad (Brattstrom and Bondello, 1979; 1983).

Mechanized sounds are characterized by higher intensities of lower frequency sounds than those sounds that occur naturally in the desert (Brattstrom and Bondello, 1983; Bondello and Brattstrom, 1978). The operation of ORVs or heavy equipment produces high intensity sound in the lower frequencies (below 3 KHz) that carry to distances exceeding 4 kilometers (Rennison and Wallace, 1976).

The effects of such sounds, as far as 4 Km from the site, on desert amphibians, such as Couch's spadefoot toad, rodents, such as the desert kangaroo rat, and dune dwelling lizards has been shown in previous work at the Algodones Dunes near Glamis (Brattstrom and Bondello, 1983).

Couch's spadefoot toad, although widespread in the Sonoran Desert east of the Colorado River, has a very limited range in the Californian Sonoran Desert. Its Californian range is along the western strip along the Colorado River from Vidal Junction (about 25 miles WSW of Parker Dam) to Ogilby, about 15 miles WNW of the Colorado River at Yuma, Arizona. It occurs between 210 meters to 335 meters elevation (CDFG).

Desert Tortoise (Gopherus [=*Xerobates] agassizii*) has both Federal and California state threatened listing and is also listed as a Federal (BLM and USFS) sensitive species on the CDFG NDDB list of special animals. Desert tortoise has been observed to use the area as habitat. A separate report on desert tortoise is being prepared by others.

Nelson's Bighorn Sheep (*Ovis canadensis nelsoni*) is on the CDFG NDDB list of special animals because of concern about population setbacks due to disease, diminished survival, and habitat loss. This subspecies is a fully protected designated animal in California. The population in the Chocolate Mountains also is pressured by habitat loss and competition from wild burrows.

This animal would use the study site occasionally with the prime habitat for this species in the adjoining Chocolate Mountains.

White Throated Woodrat (*Neotoma albigula venusta*) is listed on the CDFG NDDB list of special animals (August 1991) because of primary honey-mesquite habitat loss, and its limited range in California. This subspecies is found in the upslope, Community A thickets on-site. Its status on the NDDB list is being re-evaluated and it may be removed from the listing when a revised list is issued.

American Badger (*Taxidea taxus*) is on the CDFG NDDB special animals list with a CSC status. Badger signs were sighted by others on Section 16 on the existing Mesquite Mine site. Badgers are known from the Algodones Dunes northwest of Glamis, but have disappeared from sites accessible to off-road vehicles (Bury and Lackenbach, 1983). The badger requires friable, uncultivated ground. It is on the list because of habitat loss to agriculture, development, and population declines. The site is known to provide limited badger habitat in Community A wash habitats. The badger is an uncommon, permanent resident in its habitat. A badger was reported by mine personnel as a "road kill" on the access road to the Mesquite Mine.

Black-tailed Gnat Catcher (*Polioptila melanura*) is on the GDFG NDDB special animals list with a CSC status. This listing is due to loss of primary habitat: honey mesquite in Coachella, Imperial Co. California, and in the Colorado River Valley, as well as destruction of habitat in desert washes, and cowbird parasitism (Remsen, 1978). Desert wash habitat is important in maintaining populations (Rosenberg et al., 1991). The black-tailed gnatcatcher breeds on-site.

Bendire's Thrasher (*Toxostoma bendirei*) is on the CDFG NDDB special animals list with a CSC status, due to habitat loss; Joshua trees or yucca, and overgrazing. During the 1992 Supplemental Field Inventory it was not possible to determine if this species breeds on-site. The study site, however, does not provide conditions suitable for Joshua trees nor yucca and probably would not be prime habitat for this species.

Le Conte's Thrasher (*Toxostoma lecontei*) is on the CDFG NDDB special animals list with a CSC status due to loss of primary honey mesquite habitat and destruction of desert wash habitat. It is an uncommon and rare resident, found locally distributed with low population densities in Southern California. It was observed by others on the Mesquite Mine site as well as during our June, 1993, survey.

ANIMAL SPECIES OBSERVED ON-SITE IN NON-BREEDING HABITAT

Osprey (*Pardion haliaetus*) is on the CDFG NDDB list with a CSC status in breeding habitat. It was observed by others, and is a migrant.

Sonoran Yellow Warbler (*Dendroica petechia sonorana*) has a CDFG NDDB CSC breeding habitat listing. It is on the NDDB list due to primary habitat loss and parasitism in the Lower Colorado River Valley. It is unlikely to breed on-site due to lack of perennial water.

Grey-Headed Junco (*Junco hyemalis caniceps*) CSC, is on the CDFG NDDB list for breeding habitat. The observation represented a transitory migrant use of the site.

Virginia Warbler (*Vermivora virginiae*) is on the CDFG NDDB list with a CSC status for breeding habitat. The observation was of a transient site occurrence. The site is inappropriate breeding habitat. Several sightings of this species were made over the survey period.

Ferruginous Hawk (*Buteo regalis*) is on the CDFG NDDB list with a CSC status for wintering habitats, and is a Category 2 status for Federal listing. This species winters in the Lower Colorado River Valley, and increased concentrations have been observed around Blythe, probably due to winter agricultural fields (Rosenberg et al., 1991). The observation of this species on-site probably records visitation of the site from other preferred areas.

PLANT SPECIES OBSERVED ON-SITE

There were no endangered, threatened, rare, or candidate plants found on the study site. Four plants, fairy duster (*Calliandra eriophylla*), long-lobed four-o'clock (*Mirabilis tenuiloba*), ribbed cryptantha (*Cryptantha costata*), and booth primrose (*Camissonia boothii*) are on the NDDB Special Plants List.

Fairy Duster (*Calliandra eriophylla*) is on the CDFG list of special plants because of concern regarding its range and status. The species has no state listing status but has a state rank of "S?" (Special Plant?) and a listing in the California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of California. This plant was observed in wash habitat in upslope, community A areas close to existing mine operations. This species has been extensively discussed in previous work; see especially Pritchett (1984). Fairy duster has a very limited population on the area surveyed in 1992 for the Supplemental Field Inventory. It is much more common on the Mesquite Mine site and in other areas outside the study area. Pritchett (1984) noted that based on actual plants observed for the Mesquite Mine project the on-site population was about 4 percent of the total population in the area. Fairy duster is found outside the state of California as far east as Texas and south into Mexico.

Long-lobed Four-o'clock (*Mirabilis tenuiloba*) is listed on the CDFG NDDB list of special plants because of concern regarding its range and status. This species has no state listing status but has a state rank of "S?" (CNPS) It was not found in the 1992 Supplemental Field Inventory study area but was reported by others in the Mesquite Mine. It is on the list because of concern about its listing status and range.

Ribbed Cryptantha (*Cryptantha costata*) is on the CDFG NDDB list of special plants due to concern regarding its range and status. This species has no state listing status but has a state rank of "S?" (CNPS). It is found on-site in sandy wash deposits. The species is difficult to identify in the field, and abundance estimates were not possible during the 1992 Supplemental Field Inventory.

Booth Primrose (*Camissonia boothii)* was reported by others on the Mesquite Mine site. This species has no state listing status but has a state rank of "S"? (CNPS). The plant is on the CDFG NDDB special plants list because of concern in regard to its status and range. *Camissonia decorticans* is included taxomically with *Camissonia boothii* by some taxonists; *C. decorticans* was identified on the 1992 Supplemental Field Inventory study site.

SPECIES REPORTED NEAR STUDY SITE

The species given below were reported by the CDFG as being near the study area. None of these was observed on-site nor would these species be expected on-site.

Animals

Flat Tailed Horned Lizard (*Phrynosoma mcallii*) is listed in the East of Acolita Quadrangle by CDFG. This species is listed with a Federal category 1 and California 1 CSC status. This species was reported as 1 mile north of Glamis in the dunes. It was not seen on-site nor would it be expected on-site due to inappropriate habitat. This species is largely restricted to habitat with fine, loose sand in an open plant community.

Plants

Munz's Cactus (*Opuntia munzii*) is listed by CDFG in the East of Acolita Quadrangle, in T12S, R18E, Sec. 25 in the south end of the Chocolate Mountain Aerial Gunnery Range. This species is a Federal Category 2 status, and a California S1.2 ranking as threatened. It was not seen on-site nor would it be expected on-site due to inappropriate habitat and location.

Wiggin's Croton (*Croton wigginsii*) is listed by CDFG in the East of Acolita Quadrangle, T13S, R17E, on dunes 4 mi. E of Glamis, along the Brawley-

Glamis Road. It has a Federal 3C, rare listing, and a California state rare designation. It was not seen on-site nor would it be expected on-site due to inappropriate habitat.

Giant Spanish Needle (*Palafoxia arida var gigantea*) is limited by CDFG in the East of Acolita Quadrangle, T13S, R17E on the Algodones Dunes, about 4 miles west of Glamis. It has a Federal 3C status. It was not seen on-site nor would it be expected on-site due to inappropriate habitat.

OTHER SPECIES

Kit Fox (*Vulpes macrotis*) is a widespread species throughout the deserts of southern California. It is thought to be on the decline, due to habitat fragmentation, urbanization, and losses to road collisions. The kit fox is very common in the study area. The subspecies on-site, *Vulpes macrotis arsipus* is not on the CDFG NDDB Special Animals List.

Mule Deer (*Odocoileus hemionus*) were observed in the area. This species is not on the CDFG NDDB Special Animals List; however, this animal is of concern to CDFG because of its status as a game animal. Tracks and scat were common in the washes. Several animals were seen in the field. It appears that the study site provides habitat for deer, especially during a year where the rainfall is above normal. The ability of the area to support these animals is limited because of the lack of surface water.

California Leaf-nose Bat (*Macrotus californicus*) possibly could use the site as a food resource, but no roost sites for bats were observed on the 1992 Supplemental Field Inventory study site. The California leaf-nose bat is thought to be a declining species in California due to loss of foraging areas near the coat and to disturbance of roost sites throughout its range in southern California. It is listed as a "Species of Special Concern" by the California Department of Fish and Game and a Category 2 candidate for Federal listing. It is most common in the low deserts of Imperial, Riverside, and San Diego Counties. Suitable roosting areas are an essential component of the habitat, with caves and old mines being the most extensively used sites. We observed no bats during the field work, but bats have been previously reported by others on the Mesquite Mine (Environmental Solutions, Inc., 1987; Wier, 1983). These bats, however, were not identified as to specific species. To our knowledge, no suitable roost sites for the California leaf-nose bat are known to be present in the study site.

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APPENDIX A

CALIFORNIA DEPARTMENT OF FISH AND GAME NATURAL DIVERSITY DATA BASE ELEMENTS LOCATIONS

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*************************************************************************
OVIS CANADENSIS NELSONI                             Map Index No: 06351     *
NELSONS BIGHORN SHEEP                               Element Code: AMALE04013 *
     Element Rank                          Listing Status                   *
lobal: G4T3    CA: S3       Fed: None               CA: None                *
*************************************************************************
```

No: 37-0 Map Feature: POLYGON
Precision: SPECIFIC

e Site Last Visited: 1986XXXX
e Element Last Observed: 1986XXXX

ational Information:

Quad Name	Quadcode	DWRcode
EAST OF ACOLITA	3311511	027D
TORTUGA	3311523	028A
MAMMOTH WASH	3311522	027B
BLUE MOUNTAIN	3311521	027A
IRIS WASH	3311534	043C
LION HEAD MTN.	3311533	043D
PEGLEG WELL	3311532	042C
FRINK NW	3311546	044B

This occurrence covers more than 8 quads.

T 8S R 15E S 99 Frac Merid: S Elevation: ft.

UTM Zone: 11 UTM Northing: 3700582 Latitude: 332611
UTM Easting: 645209 Longitude: 1152616

Counties:
1 IMPERIAL
2 RIVERSIDE
3
4
5

rections: CHOCOLATE MOUNTAINS, NW PORTION OF RANGE

ulation/Stand Information:
bitat Type: UNDETERMINED
esence: Presumed Extant

scription/Comments:
EEP CONCENTRATE AT THE NW END AND THE CENTRAL PART OF THE RANGE.SHEEP ARE AL
ST ENTIRELY DEPENDENT ON NATURAL TANKS FOR WATER. MUCH OF THIS RANGE IS MARG
AL FOR SHEEP.BURRO COMPETITION IS SEVERE.POPULATION ESTIMATE OF 120 INDIVIDU
S FOR THE ENTIRE CH

rces:
rimary Source: WEAVER, R.A. 1969 (LIT)
ther: WEA69R01 WEA86U01

E 0002 RUN DATE: Fri Apr 17 14:53:25 1992

****

XEROBATES AGASSIZII Map Index No: 06371 *
DESERT TORTOISE Element Code: ARAAF01010 *
Element Rank Listing Status *
lobal: G4 CA: S2 Fed: Threatened CA: Threatened *

****

No: 4-0 Map Feature: POLYGON
Precision: SPECIFIC

e Site Last Visited: 1987XXXX
e Element Last Observed: 1987XXXX

ational Information:

Quad Name	Quadcode	DWRcode
NINEMILE WASH	3311418	026C
QUARTZ PEAK	3311417	026D
MAMMOTH WASH	3311522	027B
BLUE MOUNTAIN	3311521	027A
MT. BARROW	3311428	026B
BUZZARDS PEAK	3311427	026A
IRIS WASH	3311534	043C
LION HEAD MTN.	3311533	043D

This occurrence covers more than 8 quads.

T 8S R 16E S 6 Frac Merid: S Elevation: ft.

UTM Zone: 11 UTM Northing: 3688932 Latitude: 331951
UTM Easting: 648972 Longitude: 1152357

Counties:
1 IMPERIAL
2 RIVERSIDE
3
4
5

rections: CHUCKWALLA; MILPITAS WASH, CHUCKWALLA VALLEY AND BENCH, IN THE S
OLORADO DESERT.

ulation/Stand Information:
bitat Type: UNDETERMINED
esence: Presumed Extant

scription/Comments:
OF 4 PRIMARY POPS IN CALIF. IN 1977, EST DENSITIES WERE 20 TO 250 TORTOISES/
MI.AREA COVERS APPROX 500 SQ MI FROM 500 TO 2000 FT ELEV W/VARIOUS VEG COMM
ITIES. BLM ACEC INCLUDED.INCREASING OFF-ROAD TRAVEL & PROPOSED PRISON ARE TH
ATS BUT OVERALL, TH

rces:
rimary Source: BERRY, K. H. ET AL 1984 (LIT)
ther: BER83R01 BER84R01 BER86R02 BLM86M06

```
E 0003                          RUN DATE: Fri Apr 17 14:53:25 1992
**************************************************************************
CROTON WIGGINSII                                  Map Index No: 06451    *
WIGGIN'S CROTON                                   Element Code: PDEUP0H140 *
     Element Rank                            Listing Status              *
lobal: G3      CA: S1.2    Fed: Category 3C          CA: Rare            *
**************************************************************************

 No:  36-0                                    Map Feature: POINT
                                              Precision: NON-SPECIFIC

e Site Last Visited: 19640527
e Element Last Observed: 19640527

ational Information:
         Quad Name                        Quadcode            DWRcode
 GLAMIS                                   3211581             014A
 EAST OF ACOLITA                          3311511             027D


T 13S  R 18E  S 99  Frac     Merid: S        Elevation:   280 ft.

UTM Zone: 11    UTM Northing: 3652819        Latitude: 330005
                UTM Easting: 675635          Longitude: 1150711

                                  Counties:
                               1  IMPERIAL
                               2
                               3
                               4
                               5

rections: ALGODONES DUNES, APPROX 100 YDS OFF HWY S-78, 3 MI W OF     GLAMIS


ulation/Stand Information:
bitat Type: VALLEY AND FOOTHILL GRASSLAND
esence: Presumed Extant

scription/Comments:
0-400 FEET ELEVATION. SAND DUNES. ASSOCIATED SPP: ASTRAGALUS, EPHEDRA, PETAL
YX. (MAPPED AT ELEVATION 280).CORRIDOR ALONG N EDGE OF HWY 78 CLOSED TO VEHI
E USE 3/17/77.


rces:
rimary Source: FOWLER, S. #640323-30 UCR (HERB)
ther: BLMNDA01   FOW64S02
```

: 0004 RUN DATE: Fri Apr 17 14:53:25 1992

****

ALAFOXIA ARIDA VAR GIGANTEA Map Index No: 06453 *

IANT SPANISH-NEEDLE Element Code: PDAST6T012 *

Element Rank Listing Status *

obal: G3G5T3 CA: S2.2 Fed: Category 3C CA: None *

****

Occ: 49-0 Map Feature: POINT

Precision: NON-SPECIFIC

Site Last Visited: 19640411

Element Last Observed: 19640411

tional Information:

Quad Name	Quadcode	DWRcode
GLAMIS NW	3211582	014B
GLAMIS	3211581	014A
ACOLITA	3311512	027C
EAST OF ACOLITA	3311511	027D

T 13S R 17E S 99 Frac Merid: S Elevation: 270 ft.

UTM Zone: 11 UTM Northing: 3652846 Latitude: 330005

UTM Easting: 676252 Longitude: 1150648

Counties:

1 IMPERIAL
2
3
4
5

ections: ALGODONES DUNES, ABOUT 4 MI W OF GLAMIS, 1.0 MI W OF OSBORN PARK O RD TO BRAWLEY.

lation/Stand Information:

itat Type: DESERT DUNES

sence: Presumed Extant

scription/Comments:

LOWER PARTS OF DUNES IN 1964. IN CREOSOTE BUSH SCRUB, WITH CROTON, EPHEDRA, STRAGALUS, AND HELIANTHUS.

ces:

imary Source: VASEK, F. #640411-2 UCR (HERB)

her: MIN64S02 NIE77U21 VAS64S02

E 0005   RUN DATE: Fri Apr 17 14:53:25 1992

****

PHRYNOSOMA MCALLII   Map Index No: 06471 *
FLAT TAILED HORNED LIZARD   Element Code: ARACF12040 *
Element Rank   Listing Status *
lobal: G3   CA: S2   Fed: Category 1   CA: None *

****

No: 57-0   Map Feature: POINT
                                                  Precision: NON-SPECIFIC

e Site Last Visited: XXXXXXXX
e Element Last Observed: XXXXXXXX

ational Information:

Quad Name	Quadcode	DWRcode
GLAMIS	3211581	014A
EAST OF ACOLITA	3311511	027D

T 13S R 18E S 27 Frac   Merid: S   Elevation: 360 ft.

UTM Zone: 11   UTM Northing: 3653310   Latitude: 330018
UTM Easting: 680374   Longitude: 1150409

Counties:
1 IMPERIAL
2
3
4
5

rections: 1 MI N OF GLAMIS, ALGODONES DUNES.

ulation/Stand Information:
bitat Type: UNDETERMINED
esence: Presumed Extant

scription/Comments:
CM #74206.

rces:
rimary Source: BLM DPS, 1980 (PERS)
ther: BLM80U01

: 0006 RUN DATE: Fri Apr 17 14:53:25 1992

****

)PUNTIA MUNZII Map Index No: 06480 *

1UNZ'S CACTUS Element Code: PDCAC0D0V0 *

Element Rank Listing Status *

.obal: G1 CA: S1.2 Fed: Category 2 CA: None *

****

No: 5-0 Map Feature: POINT

Precision: NON-SPECIFIC

: Site Last Visited: 1981XXXX

: Element Last Observed: 1981XXXX

ational Information:

Quad Name	Quadcode	DWRcode
EAST OF ACOLITA	3311511	027D

T 12S R 18E S 25 Frac Merid: S Elevation: 650 ft.

JTM Zone: 11 UTM Northing: 3662789 Latitude: 330524

UTM Easting: 683342 Longitude: 1150207

Counties:

1 IMPERIAL

2

3

4

5

rections: S END CHOCOLATE MOUNTAIN AERIAL GUNNERY RANGE.

ulation/Stand Information:

bitat Type: UNDETERMINED

esence: Presumed Extant

scription/Comments:

J DISTURBANCES - LIMITED ACCESS.RECORDED AS RARE OR UNCOMMON DURING DESERT T
TOISE TRANSECT SURVEY. APPEARS TO BE SOMEWHAT ISOLATED FROM MAIN DISTRIBUTIO
OF PLANT WHICH IS ON THE NORTH SIDE OF THE CHOCOLATE MTNS AT THIS END OF THE
HOCOLATE MTNS AERIA

rces:

rimary Source: BERRY, K.H. ET AL 1983 (LIT)

ther: BER83R01

```
E 0007                              RUN DATE: Fri Apr 17 14:53:25 1992
***************************************************************************
CROTON WIGGINSII                                        Map Index No: 06485     *
WIGGIN'S CROTON                                         Element Code: PDEUP0H140 *
      Element Rank                             Listing Status                   *
lobal: G3      CA: S1.2     Fed: Category 3C           CA: Rare                 *
***************************************************************************

 No:  33-0                                       Map Feature: POINT
                                                 Precision: NON-SPECIFIC

e Site Last Visited: 19620513
e Element Last Observed: 19620513

ational Information:
          Quad Name                          Quadcode            DWRcode
 EAST OF ACOLITA                             3311511             027D

T 13S  R 17E  S 99  Frac     Merid: S        Elevation:   540 ft.

UTM Zone: 11   UTM Northing: 3656221          Latitude: 330150
               UTM Easting: 684711            Longitude: 1150119

                                   Counties:
                              1   IMPERIAL
                              2
                              3
                              4
                              5

rections: SAND DUNES 4 MI E OF GLAMIS, ALONG BRAWLEY-GLAMIS RD.

ulation/Stand Information:
bitat Type: DESERT DUNES
esence: Presumed Extant

scription/Comments:
EQUENT THROUGHOUT SAND DUNES IN 1962.NORTH SIDE OF THE CHOCOLATE MTNS AT THI
END OF THE CHOCOLATE MTNS AERIA

rces:
rimary Source: MOBERLY, W.R. #62513-5 UCR (HERB)
ther: MOB62S02
```

```
************************************************************************************
OVIS CANADENSIS NELSONI                              Map Index No: 06497     *
NELSONS BIGHORN SHEEP                              . Element Code: AMALE04013 *
      Element Rank                            Listing Status                  *
lobal: G4T3     CA: S3       Fed: None                      CA: None          *
************************************************************************************
```

No: 46-0

Map Feature: POLYGON
Precision: SPECIFIC

e Site Last Visited: 1986XXXX
e Element Last Observed: 1986XXXX

ational Information:

Quad Name	Quadcode	DWRcode
EAST OF ACOLITA	3311511	027D
NINEMILE WASH	3311418	026C
BLUE MOUNTAIN	3311521	027A
MT. BARROW	3311428	026B

T 12S R 19E S 0 Frac Merid: S Elevation: ft.

UTM Zone: 11 UTM Northing: 3667716 Latitude: 330803
UTM Easting: 683318 Longitude: 1150205

Counties:
1 IMPERIAL
2
3
4
5

rections: CHOCOLATE MOUNTAINS, SE PORTION OF RANGE.

ulation/Stand Information:
bitat Type: UNDETERMINED
esence: Presumed Extant

scription/Comments:
EEP CONCENTRATE AT THE NORTHERN END OF THE CHOCOLATE MTNS.POPULATION ESTIMAT
OF 120 INDIVIDUALS FOR THE ENTIRE CHOCOLATE MTNS.

rces:
rimary Source: WEAVER, R.A. 1969 (LIT)
ther: WEA69R01 WEA86U01

APPENDIX B

PERENNIAL PLANT LINE TRANSECTS

TABLE OF PERENNIAL LINE TRANSECT DATA FOR THE RAILROAD SPUR FOR THE PROPOSED MESQUITE REGIONAL LANDFILL

	Transect (cm)												
Species	1	8	3	5	5	5	3	8	5	12	11	12	13
Olneya (Ironwood)			585		155		880						
Cercidium (Paloverde)			12										
Larrea (Creosote bush)	110	102	460	238	110	225	850	410	815	850			
Krameria (Ratany)	222		11	880	110								
Encelia (Brittle bush)				30	305		230	120		240	265	21	100
Ambrosia (White bursage)	55		89	130	2				12			54	100
Hilaria (Big galleta)				12									
Hymenoclea (Cheesebush)													

Line transects were made starting at the western end of the proposed railroad spur. These transects were started approximately 100 feet in from the northern boundary marker and made every 1,000 feet. Each transect was 100 meters in length and all perennial species were recorded in centimeters.

TABLE OF PERENNIAL LINE TRANSECT DATA FOR THE RAILROAD SPUR FOR THE PROPOSED MESQUITE REGIONAL LANDFILL, cont.

	Transect (cm)										
Species	**14**	**15**	**16**	**17**	**17**	**23**	**23**	**21**	**21**	**23**	**21**	**25**
Olneya (Ironwood)						600	390					
Cercidium (Paloverde)												
Larrea (Creosote bush)	610	455	110	555	170			80		100	420	
Krameria (Ratany)												
Encelia (Brittle bush)		100				80		119			5	
Ambrosia (White bursage)						110	80	80		100	80	
Hilaria (Big galleta)												
Hymenoclea (Cheesebush)											75	90

Line transects were made starting at the western end of the proposed railroad spur. These transects were started approximately 100 feet in from the northern boundary marker and made every 1,000 feet. Each transect was 100 meters in length and all perennial species were recorded in centimeters.

TRANSECT OF PERENNIAL SPECIES
RELATIVE AND TOTAL PERCENTAGES
(Total transect length = 2500 meters)

Species	Total (cm)	Relative %	Total Transect %
Olneya (Ironwood)	2,160	18.0	0.90
Cercidium (Paloverde)	12	0.1	0.00
Larrea (Creosote bush)	6,460	53.8	2.60
Krameria (Ratany)	653	5.4	0.30
Encelia (Brittle bush)	1,663	13.9	0.70
Ambrosia (White bursage)	863	7.2	0.30
Hilaria (Big galleta)	30	0.2	0.00
Hymenoclea (Cheesebush)	165	1.4	0.10
		100.0	4.90

NOTE: Other perennial species including paloverde, lycium, desert lavender, hibiscus, and sweetbush are found in dense wash communities which are shown in a bank transect in the Table of Perennial Line Transect Data of a Wash Bank (see next page in this Appendix).

TABLE OF PERENNIAL LINE TRANSECT DATA OF A WASH BANK
IN THE STUDY AREA FOR THE PROPOSED MESQUITE REGIONAL LANDFILL

ALONG NORTHERN BANK

Species	cm	cm	cm	cm	cm	Total (cm)	Percentage of Bank Transect
Cercidium (Paloverde)	1680	1370	500	700		4250	28
Lycium (*Lycium* sp.)	2[illegible]0	900	150	1900	2300	5200	35
Olneya (Ironwood)	650	1900				1650	11
Hyptis (Desert lavender)	200					200	1
Hyptis/Lycium (Desert lavender/*Lycium* sp.)	1900					1900	13
Hymenoclea (Cheesebush)	100					100	0.5
Hibiscus (Rock hibiscus)	100					100	0.5
						Sum	89-90

Line transects were made starting along the northern bank of a major wash. A total of 150 meters was surveyed on the northern bank and 50 meters on the southern bank of the wash.

TABLE OF PERENNIAL LINE TRANSECT DATA OF A WASH BANK
IN THE STUDY AREA FOR THE PROPOSED MESQUITE REGIONAL LANDFILL

ALONG SOUTHERN BANK

Species	cm	cm	cm	cm	cm	Total (cm)	Percentage of Bank Transect
Lycium (*Lycium* sp.)	200	300	850	1000	850	2500	50
Hyptis (Desert lavender)	100	850	850			1400	28
Bebbia (Sweet bush)	850	850				700	14
						Sum	92

Line transects were made starting along the northern bank of a major wash. A total of 150 meters was surveyed on the northern bank and 50 meters on the southern bank of the wash.

APPENDIX C

ANIMAL TRAPPING DATA

SITE 1

SMALL MAMMAL TRAPPING RESULTS

Species Name		Number of Individuals Captured	Percent of Individuals Captured
Common	Scientific		
Desert pocket mouse	*Perognathus penicillatus*	2	100

The number of traps checked on the morning of April 14, 1991 was 68.

The trapping site was in and adjoining a poorly-defined broad wash in which the dominant plants were ironwood, paloverde, and creosote bush.

SITE 2

SMALL MAMMAL TRAPPING RESULTS

Species Name: Common	Species Name: Scientific	Number of Individuals Captured	Percent of Individuals Captured
Little pocket mouse	*Perognathus longimembris*	1	10
Desert pocket mouse	*Perognathus penicillatus*	5	50
Colorado Valley woodrat	*Neotoma albigula venusta*	4	40

The number of traps checked on the morning of April 15, 1992 was 68.

The trapping site was in and adjoining a large wash in which the dominant plants were ironwood, paloverde, Anderson thornbush, and creosote bush.

SITE 3

SMALL MAMMAL TRAPPING RESULTS

Species Name		Number of Individuals Captured	Percent of Individuals Captured
Common	Scientific		
Bailey pocket mouse	*Perognathus baileyi*	2	8
Long-tailed pocket mouse	*Perognathus formosus*	3	13
Desert pocket mouse	*Perognathus penicillatus*	2	8
Spiny pocket mouse	*Perognathus spinatus*	6	25
Colorado Valley woodrat	*Neotoma albigula venusta*	11	46

The number of traps checked on the morning of April 28, 1992 was 100.

The trapping was in and adjoining a large wash in which the dominant plants were ironwood, paloverde, Anderson thornbush, and creosote bush.

SITE 4

SMALL MAMMAL TRAPPING RESULTS

Species Name		Number of Individuals Captured	Percent of Individuals Captured
Common	Scientific		
Desert pocket mouse	*Perognathus penicillatus*	5	100

The number of traps checked on the morning of April 29, 1992 was 50.

The trapping site was in a small wash in which the dominant plants were ironwood, creosote bush, brittle bush, white bursage, and ratany.

SITE 5

SMALL MAMMAL TRAPPING RESULTS

Species Name: Common	Species Name: Scientific	Number of Individuals Captured	Percent of Individuals Captured
Merriam kangaroo rat	*Dipodomys merriami*	1	11
Long-tailed pocket mouse	*Perognathus formosus*	1	11
Desert pocket mouse	*Perognathus penicillatus*	5	56
Colorado Valley woodrat	*Neotoma albigula venusta*	1	11
Desert woodrat	*Neotoma lepida*	1	11

The number of traps checked on the morning of April 29, 1992 was 50.

The trapping site was in a small wash and in an adjoining area of packed sand in which the dominant plants were ironwood, brittle bush, creosote bush, white bursage, and ratany.

SITE 6

SMALL MAMMAL TRAPPING RESULTS

Species Name		Number of Individuals Captured	Percent of Individuals Captured
Common	Scientific		
Desert pocket mouse	*Perognathus penicillatus*	6	75
Colorado Valey woodrat	*Neotoma albigula venusta*	1	12.5
Desert woodrat	*Neotoma lepida*	1	12.5

The number of traps checked on the morning of April 29, 1992 was 50.

The trapping site was in a small wash in which the dominant plants were ironwood and paloverde.

SITE 7

SMALL MAMMAL TRAPPING RESULTS

Species Name			
Common	Scientific	Number of Individuals Captured	Percent of Individuals Captured
Desert pocket mouse	*Perognathus penicillatus*	2	67
Colorado Valley woodrat	*Neotoma albigula venusta*	1	33

The number of traps checked on the morning of April 29, 1992 was 50.

The trapping site was in and adjoining a wash in which the dominant plants were ironwood and paloverde.

SITE 8

SMALL MAMMAL TRAPPING RESULTS

Species Name: Common	Species Name: Scientific	Number of Individuals Captured	Percent of Individuals Captured
Merriam kangaroo rat	*Dipodomys merriami*	2	20
Desert pocket mouse	*Perognathus penicillatus*	6	60
Colorado Valley woodrat	*Neotoma albigula venusta*	2	20

The number of traps checked on the morning of April 30, 1992 was 50.

The trapping site was in a small wash and adjoining sandy desert in which the dominant plants were ironwood, paloverde, Anderson thornbush, and creosote bush.

SITE 9

SMALL MAMMAL TRAPPING RESULTS

Species Name: Common	Species Name: Scientific	Number of Individuals Captured	Percent of Individuals Captured
Bailey pocket mouse	*Perognathus baileyi*	3	23
Desert pocket mouse	*Perognathus penicillatus*	5	38
Spiny pocket mouse	*Perognathus spinatus*	3	23
Colorado Valley woodrat	*Neotoma albigula venusta*	1	8
Desert woodrat	*Neotoma lepida*	1	8

The number of traps checked on the morning of April 30, 1992 was 50.

The trapping site was in a large wash in which the dominant plants were ironwood and paloverde.

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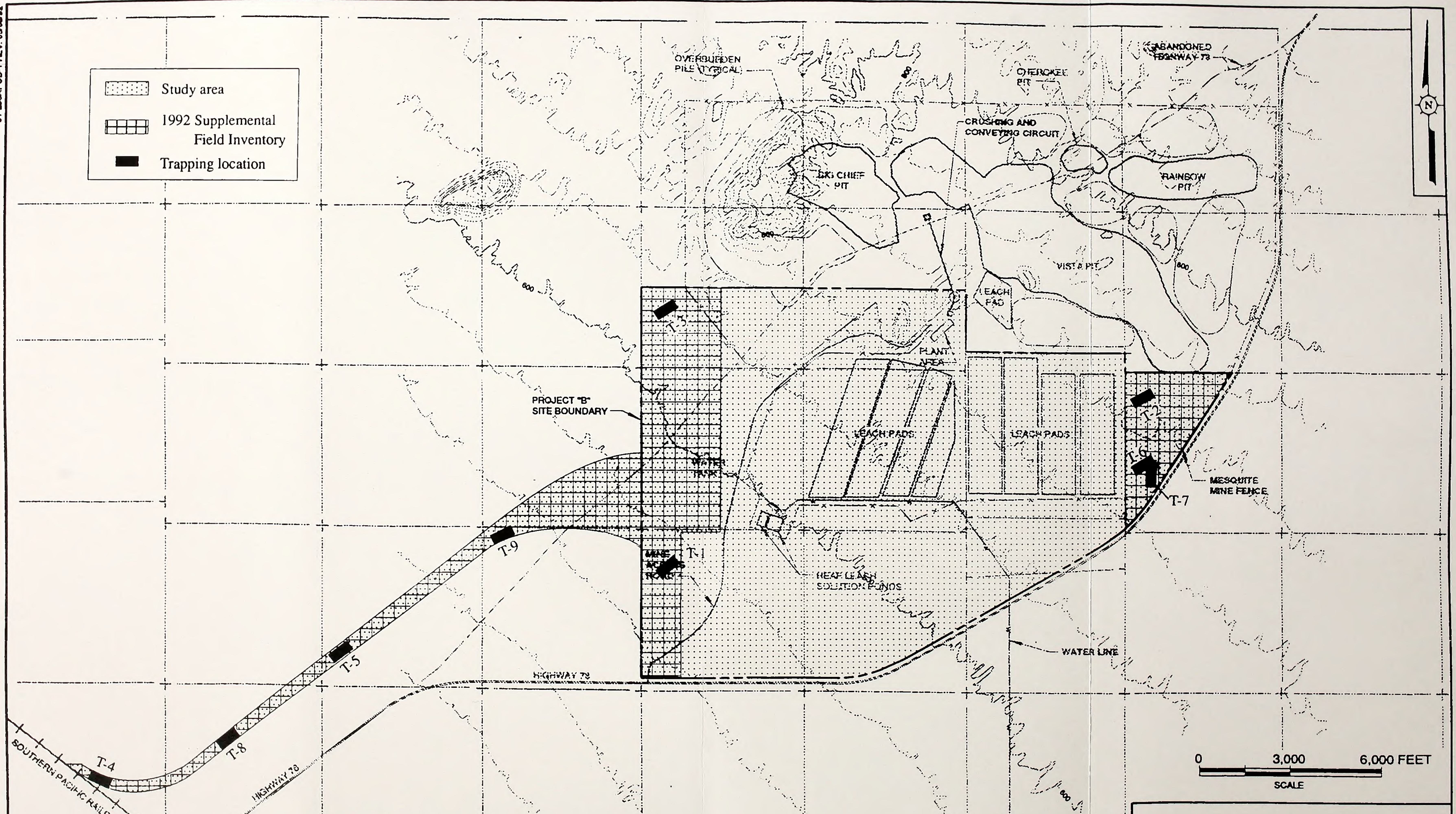

Figure 1. Location of Animal Trapping.

MESQUITE REGIONAL LANDFILL

MESQUITE REGIONAL LANDFILL EIS/EIR

APPENDIX D-2

BIOLOGICAL INVENTORY OF THE GOSSER PROPERTIES

MAY 29, 1992

BIOLOGICAL INVENTORY
OF THE GOSSER PROPERTIES
MESQUITE REGIONAL LANDFILL PROJECT

Prepared for:

Environmental Solutions, Inc.
21 Technology Drive
Irvine, California 92718

Prepared by:

Western Ecological Services Company, Inc. (WESCO)
384 Bel Marin Keys Blvd, Suite B
Novato, California 94949

May 29, 1992
ESI 9201

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INTRODUCTION

PURPOSE

Western Ecological Services Company, Inc. (WESCO) has conducted a biological assessment of 5 sites referred to herein as the Gosser Properties. The Gosser Properties are lands offered by Gold Fields Operating Company in exchange for U. S. Bureau of Land Management (BLM) lands contained within the proposed Mesquite Regional Landfill project area in eastern Imperial County. The lands offered by Gold Fields for exchange were selected to enhance the protection of important plant and wildlife habitats, and/or enhance the BLM's ability to manage federally-owned scenic areas.

This biological assessment was conducted to identify existing biological resources on the 5 Gosser Properties. Emphasis was placed on assessing plant communities, wildlife use, and the potential occurrence of special-status plants and animals.

STUDY AREAS

The Gosser Properties are located in Riverside and Imperial counties. The properties in Riverside County include two 1/4-sections (160 acres each) situated on the Martinez Mountain and Valerie U.S.G.S. Quadrangles. These properties are referred to as Sections 7 and 23, respectively. Sections 7 and 23 are located in the Santa Rosa Mountains, west of the Coachella Valley and approximately 13 miles south of Indio (Figure 1).

The properties in Imperial County include 3 entire sections (640 acres each) situated on the Wiley Well and West of Palo Verde Peak U.S.G.S. Quadrangles. These properties are referred to herein as Sections 1, 11, and 21. Located in the Colorado Desert approximately 26 miles southeast of Blythe, these sections occur at low elevations between the Little Chuckwalla Mountains and the Palo Verde Mountains and north of the Smoketree Valley (Figure 1).

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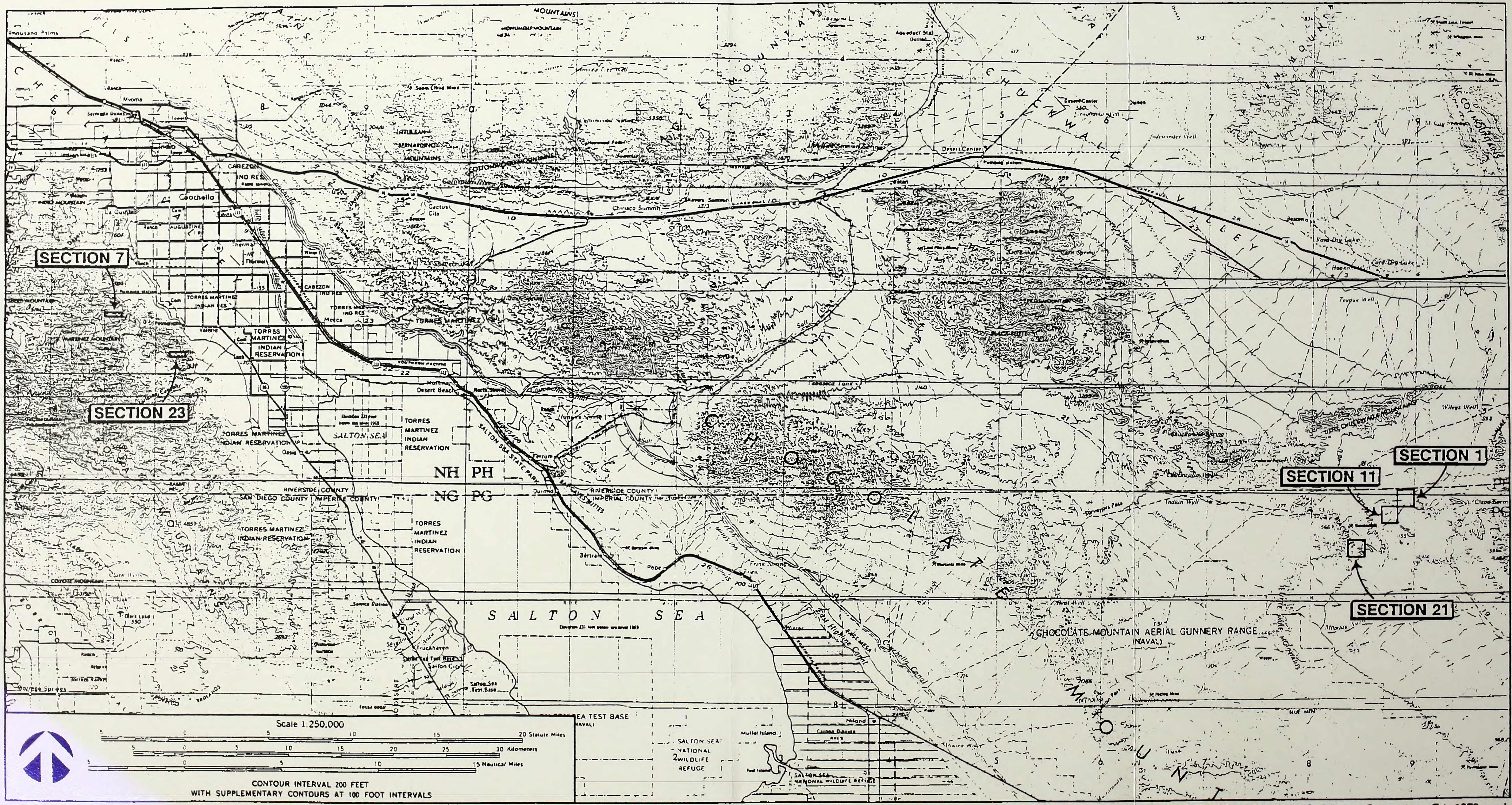

BASE MAP: USGS 1:250,000-Scale Maps - *Santa Ana, CA.* 1979 and *Salton Sea, CA.* 1969

WESCO

Biological Assessment of the Gosser Properties
Mesquite Regional Landfill Project

FIGURE 1

GOSSER PROPERTY REGIONAL LOCATION MAP

METHODS

Scientific literature and other environmental documentation pertinent to the Gosser Properties and vicinity was reviewed by WESCO's wildlife biologist and botanist. Representatives of California Department of Fish and Game (CDFG), U. S. Forest Service, and BLM were also contacted regarding potential occurrence of special-status species. In addition, the California Natural Diversity Database (RareFind) was searched for special-status species records in the vicinity of each the 5 Gosser Properties.

Reconnaissance level field surveys of each property were also conducted by a wildlife biologist and a botanist. Surveys were conducted during the period of May 4-6, 1992. Using 7.5 minute topographic maps, each property was located, and to the extent possible, searched to identify plants, animals, and communities present. Emphasis was placed on assessing existing habitat conditions and feasibility of occurrence of special-status species. Section 23 was inaccessible due to steep and unstable slopes, and subsequently close examination was not possible. Existing biotic resources could only be extrapolated from those observed on Section 7 which is located at a similar elevational range.

This field effort did not include focused surveys for special-status species conducted in compliance with CDFG and U. S. Fish and Wildlife Service (USFWS) guidelines. Such surveys are seasonal in nature, require multiple site visits and thorough site coverage.

EXISTING CONDITIONS

Classification of vegetation on each property was based on *Preliminary Descriptions of Terrestrial Natural Communities of California* as described by Holland (1986). Due to the timing (late spring) and limited duration of surveys, detailed inventories of plants and animals were not possible. Plants and animals identified represent only a small number of species occurring on the Gosser Properties. Surveys were conducted when many plant species were past blooming and were therefore not identifiable. In addition, thorough coverage of each property and labor intensive methods such as small mammal trapping were not possible given time constraints.

Based on field surveys, the Gosser Properties and adjacent lands were determined to support relatively undisturbed natural plant communities with high wildlife resource value.

RIVERSIDE COUNTY SECTIONS

Both of the 1/4 sections in Riverside County are located in the Santa Rosa Mountains and occur on very steep granitic slopes. Neither of these properties appear to have been disturbed by either current or historic activities. There is one dominant plant community on Section 7. Because Section 23 was inaccessible due to steep and unstable slopes, we can only extrapolate that the same plant community was dominant due to similar elevational ranges of the sections.

Vegetation and Wildlife Habitat

Vegetation observed on Section 7 is classified as Sonoran mixed woody and succulent scrub, based on the description provided by Holland (1986). Plants and animals identified during WESCO surveys are listed in appendices A1 and B1 respectively.

Sonoran Mixed Woody and Succulent Scrub. This community generally occurs on rocky, well-drained slopes and alluvial fans. The terrain is more varied and the moisture supply is often greater than in creosote brush scrub. Elevational range of this plant community is usually between 1,000 and 4,000 feet above sea level. This is the only Colorado Desert community with substantial dominance of cacti and other stem succulents. It is dominated by shrubs (.5-3 m tall), similar to Sonoran creosote bush scrub but generally more varied and usually more dense. This community includes species found in both Sonoran creosote bush scrub and dry desert woodland wash communities (described below) with no clear dominant. Most stands include desert agave (*Agave deserti*), brittlebush (*Encelia farinosa*), ocotillo (*Fouquieria splendens*), and creosote bush (*Larrea divaricata*).

Section 7

Elevations of this property range from approximately 1,000 to 2,400 feet above sea level (Figure 2). Representative photographs of the site are provided in Figure 3. This 1/4 section consists of a ridge with an associated drainage. The drainage has carved small pools in granite bedrock and provides an intermittent source of water for local wildlife. There are no obvious breaks in plant species composition throughout the site. Characteristic plant species include, cats claw (*Acacia greggii*), desert agave, brittle bush, barrel cactus (*Ferocactus acanthodes*), ocotillo, creosote bush, and jumping cholla (*Opuntia bigelovii*).

Section 23

Elevations of this property range from approximately 800 to 2,520 feet above sea level (Figure 4). A representative photograph of the site vicinity and the southeast corner of the site are provided in Figure 5. Steep unstable slopes precluded our ability to gain access to the site. However, it is highly likely that plant species common to Sonoran mixed woody and succulent scrub occur due to the elevations of the site.

IMPERIAL COUNTY SECTIONS

Sections 1, 11, and 21 are located in the lowlands of eastern Imperial County and are characteristically flat with areas of minor topographic relief. Numerous braided channels cross each of these sections. Jeep roads cross these sections and evidence of all-terrain vehicle (ATV) use was apparent, however, none of these sections appear to have been significantly disturbed. Plants and animals identified during WESCO surveys are listed in appendices A2 and B2 respectively.

Plant Communities and Wildlife Habitats

Vegetation observed on sections 1, 11, and 21 is classified below into two prominent types: desert dry wash scrub, and Sonoran creosote bush scrub.

Dry Desert Wash Scrub. This open to dense, drought deciduous, microphyllous riparian thorn scrub woodland ranges from 20-45 feet tall. This community generally occurs along the large drainages, and sandy to gravelly washes and arroyos of the Colorado Desert. These washes typically have braided channels that substantially rearrange with every surface flow event. It is dominated by several fabaceous trees including cats claw acacia, and palo verde (*Cercidium floridum*), with an understory of the perennial galeta grass (*Hilaria rigida*).

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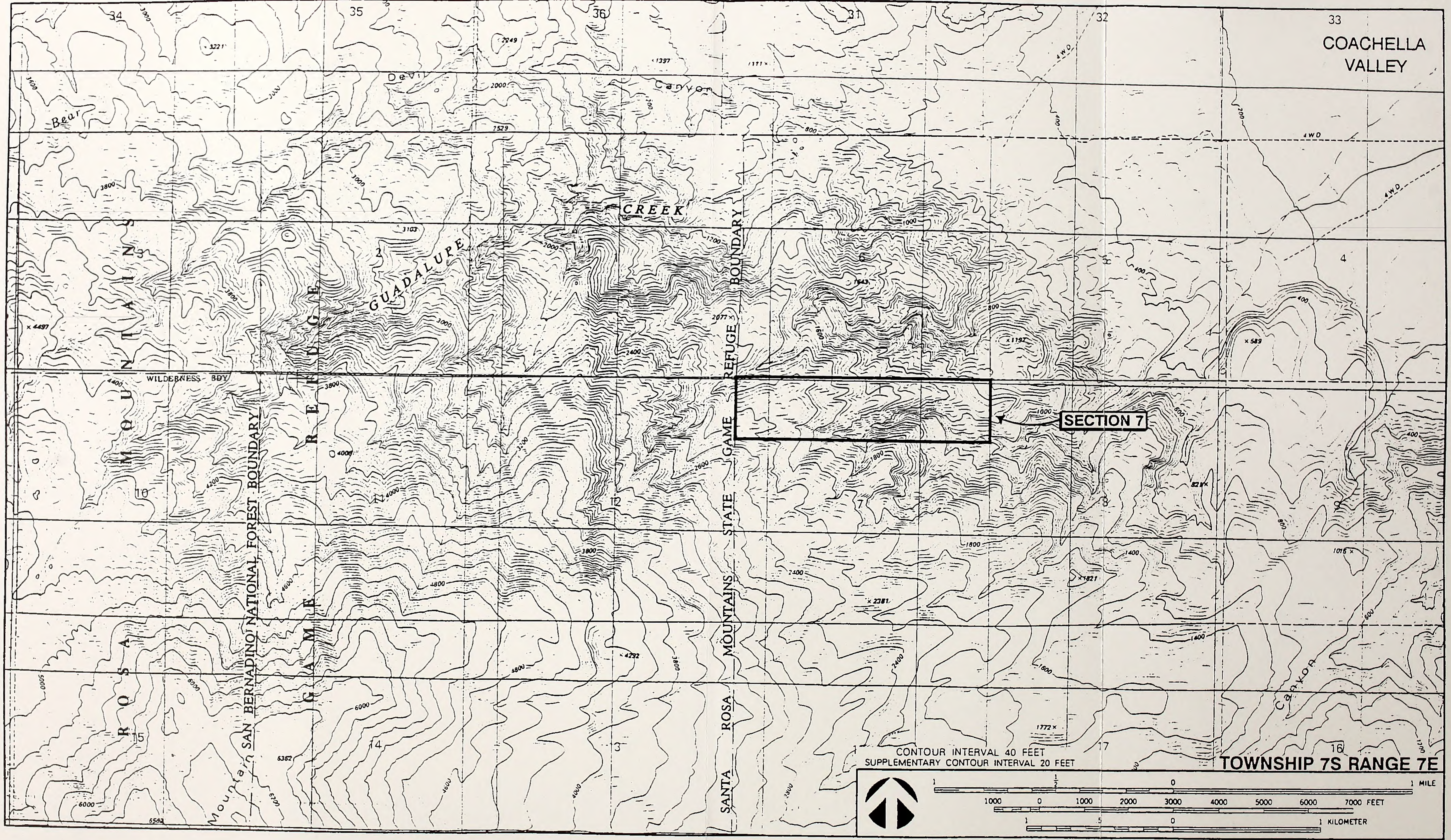
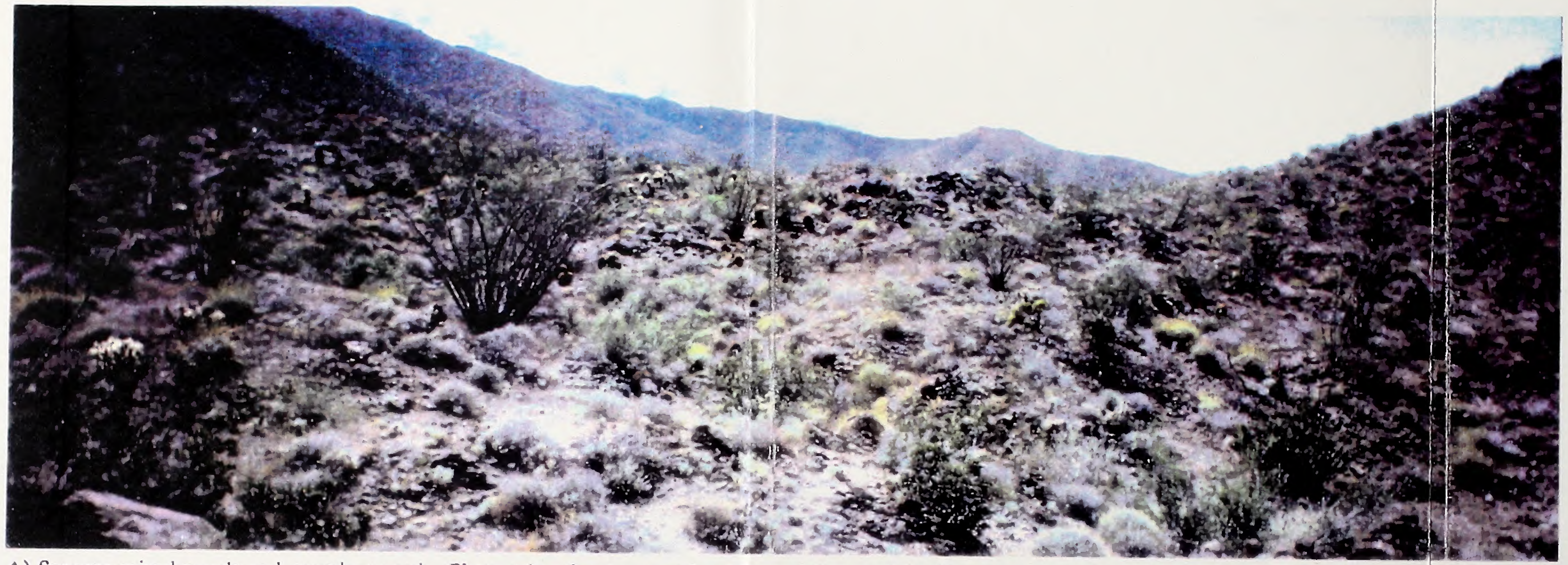


BASE MAP: USGS 7.5' Quadrangle - *Martinez Mtn., CA.* 1988

Biological Assessment of the Gosser Properties
Mesquite Regional Landfill Project

FIGURE 2

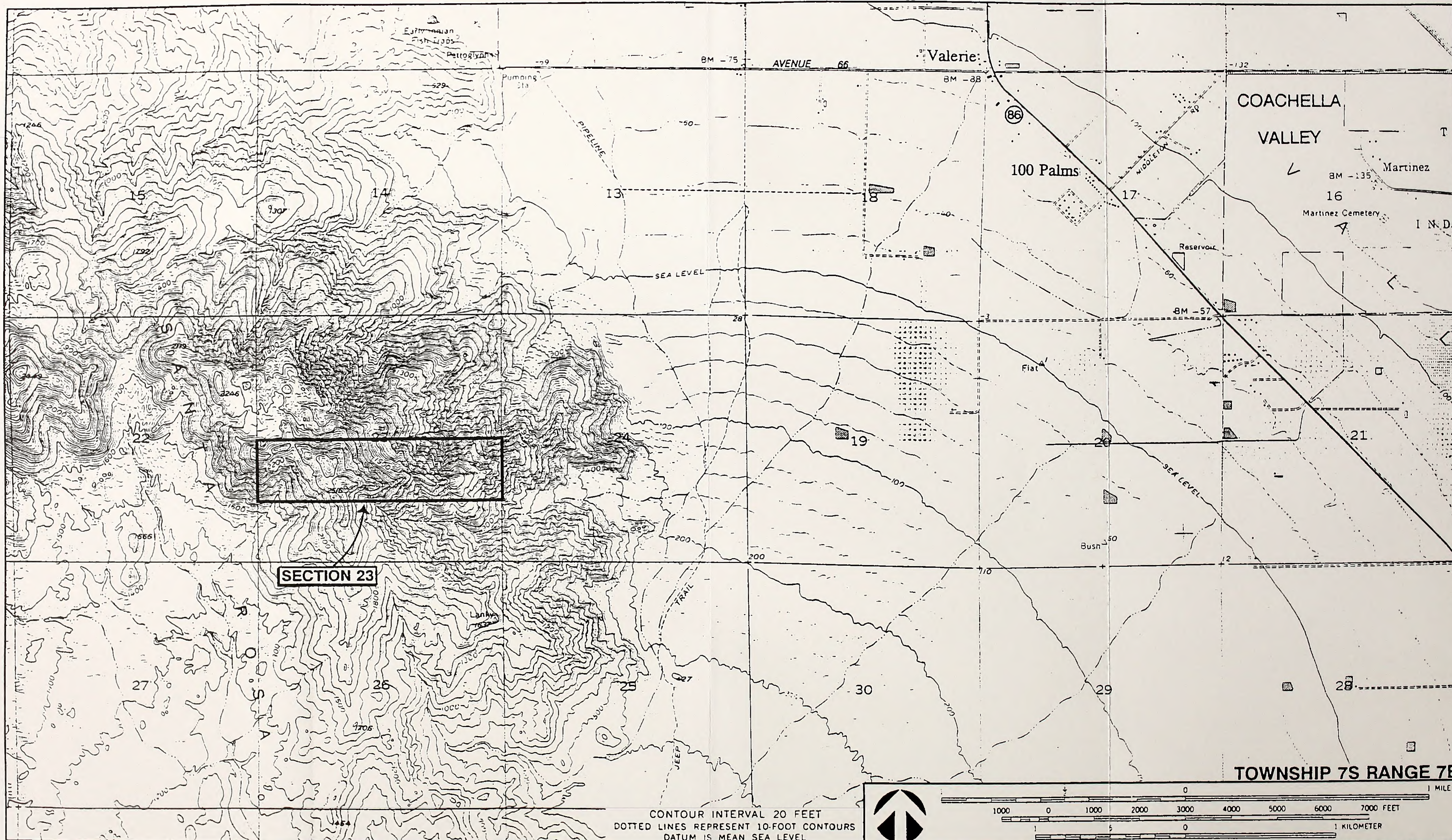
GOSSER PROPERTY LOCATION
-SECTION 7



A) Sonoran mixed woody and succulent scrub. Photo taken from eastern boundary of Section 7, looking west.

B) Section 7 location as observed from valley floor

C) View from eastern boundary of Section 7, looking east over Coachella Valley.

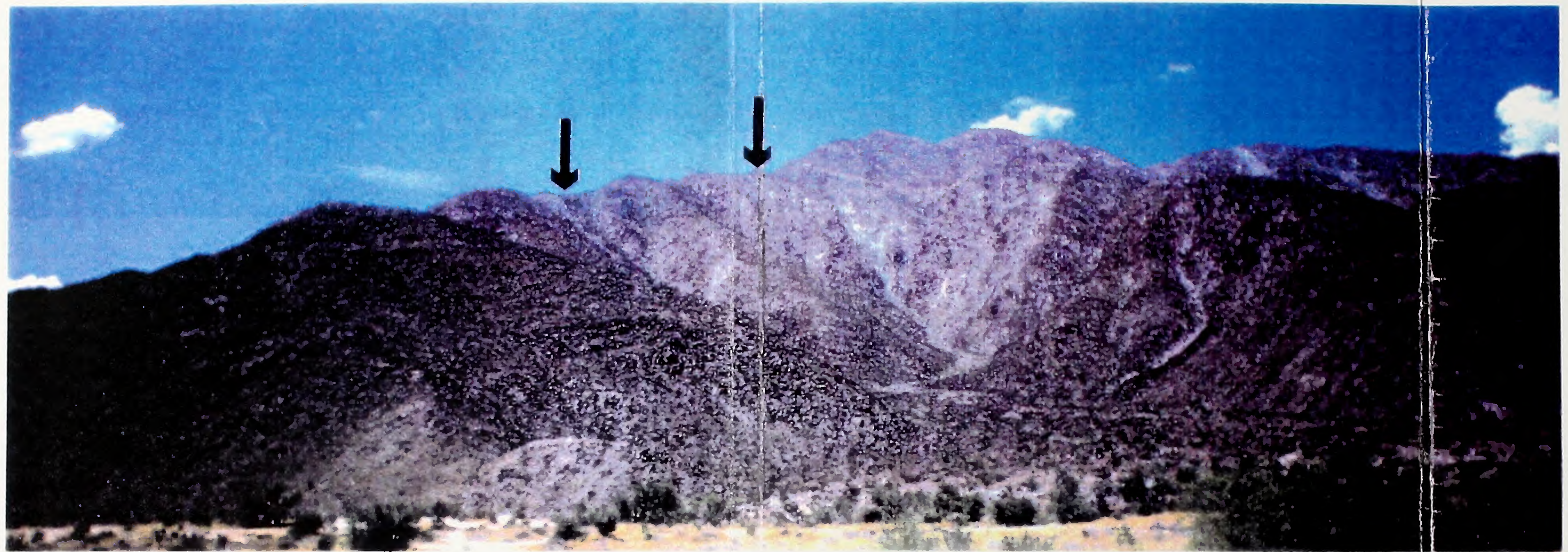


BASE MAP: USGS 7.5' Quadrangle - *Valerie, CA.* 1972

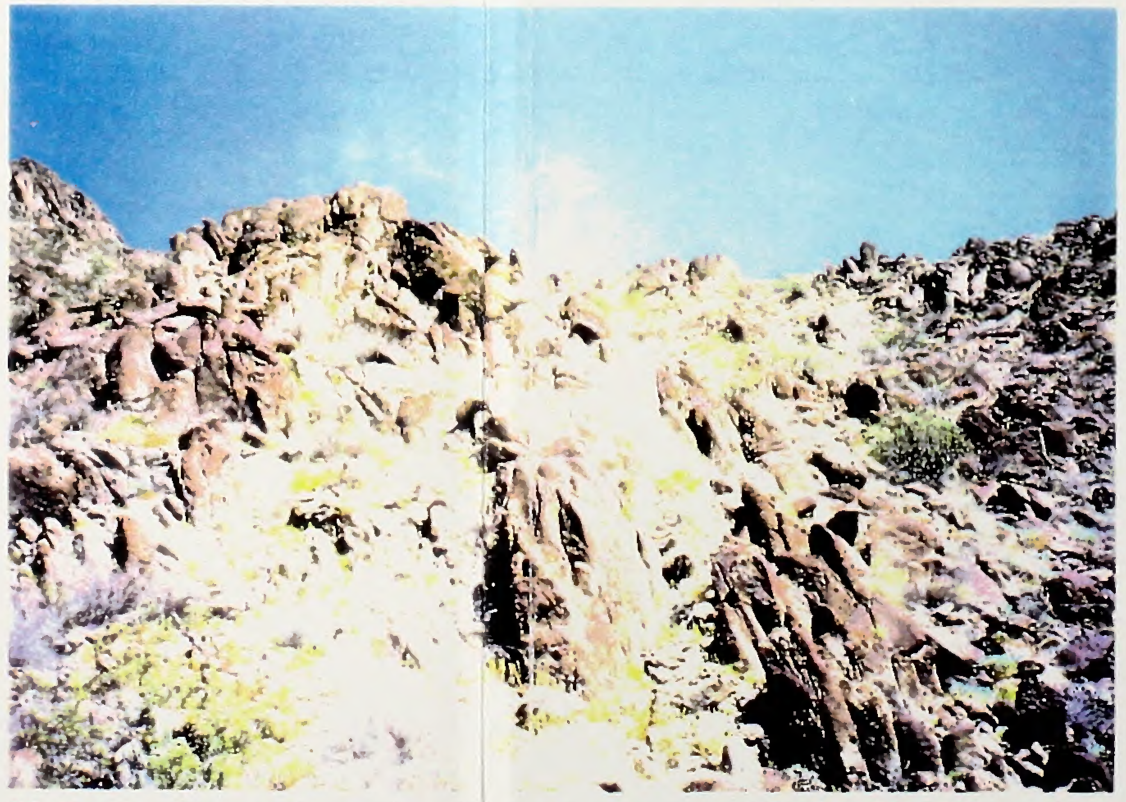
Biological Assessment of the Gosser Properties
Mesquite Regional Landfill Project

FIGURE 4

GOSSER PROPERTY LOCATION
-SECTION 23



A) Eastern boundary of Section 23 as observed from valley floor.



B) Rocky substrate observed at the southeast corner of Section 23; 800-foot elevation.

Sonoran Creosote Bush Scrub. This community is dominated by shrubs (.5-3 m tall), widely spaced, usually with bare ground between. Growth occurs from winter to early spring if rainfall is sufficient. Some succulents occur in this community. Shrubs may be dormant for long periods. Many species of ephemeral herbs may flower in late February to March. This is the basic creosote scrub of the Colorado Desert. It occurs on well drained secondary soils from slopes, fans and valleys with very low available water holding capacity. This is the dominant plant community below 2,500 feet. Common species encountered in this habitat include burrobush (*Ambrosia dumosa)*, brittlebrush, ocotillo , and creosote bush.

Sections 1 and 11

Elevations of Sections 1 range from approximately 735 to 985 feet and elevations of Section 11 range from 790 to 900 feet (Figure 6). Representative photographs of each site are provided in Figures 7 and 8. There are several large dry sandy to gravelly washes with mature desert dry wash scrub vegetation. The washes observed on the properties typically had a large gravel bed, sometimes more than 30 feet in width with banks up to three or four feet high. The bottom of the washes are unvegetated, and vegetation is concentrated along the banks (Figures 7b and 8c).

Many, less defined, braided drainage swales cross both of these sites. Vegetation along these drainages is less dense and less diverse and was typically observed growing in the bottom of the swales (Figure 8b). Typical species encountered along the swales were generally a mix of dry desert wash scrub species and Sonoran creosote scrub species.

Sonoran creosote bush scrub grows at the lower elevations of the sites with a ground cover of annual flats. Higher elevations of the sites are rocky and creosote bush scrub species are scattered between the outcrops. A higher diversity of succulent (i.e. cactus) species grow at the higher elevations. Cactus species observed include barrel cactus, beavertail cactus (*Opuntia basilaris*), and jumping cholla. Large areas of exposed basalt ("desert pavement") occur between the drainage swales that direct surface runoff from the higher elevations to the valley floor. No plant species grow within this inhospitable environment.

Section 21

Elevations of Section 21 range from 840 to 970 feet above sea level (Figure 9). Existing conditions are illustrated in Figure 10. This site differs from Sections 1 and 11 in that there are no large dry washes. All of the drainages on Section 21 are small and more

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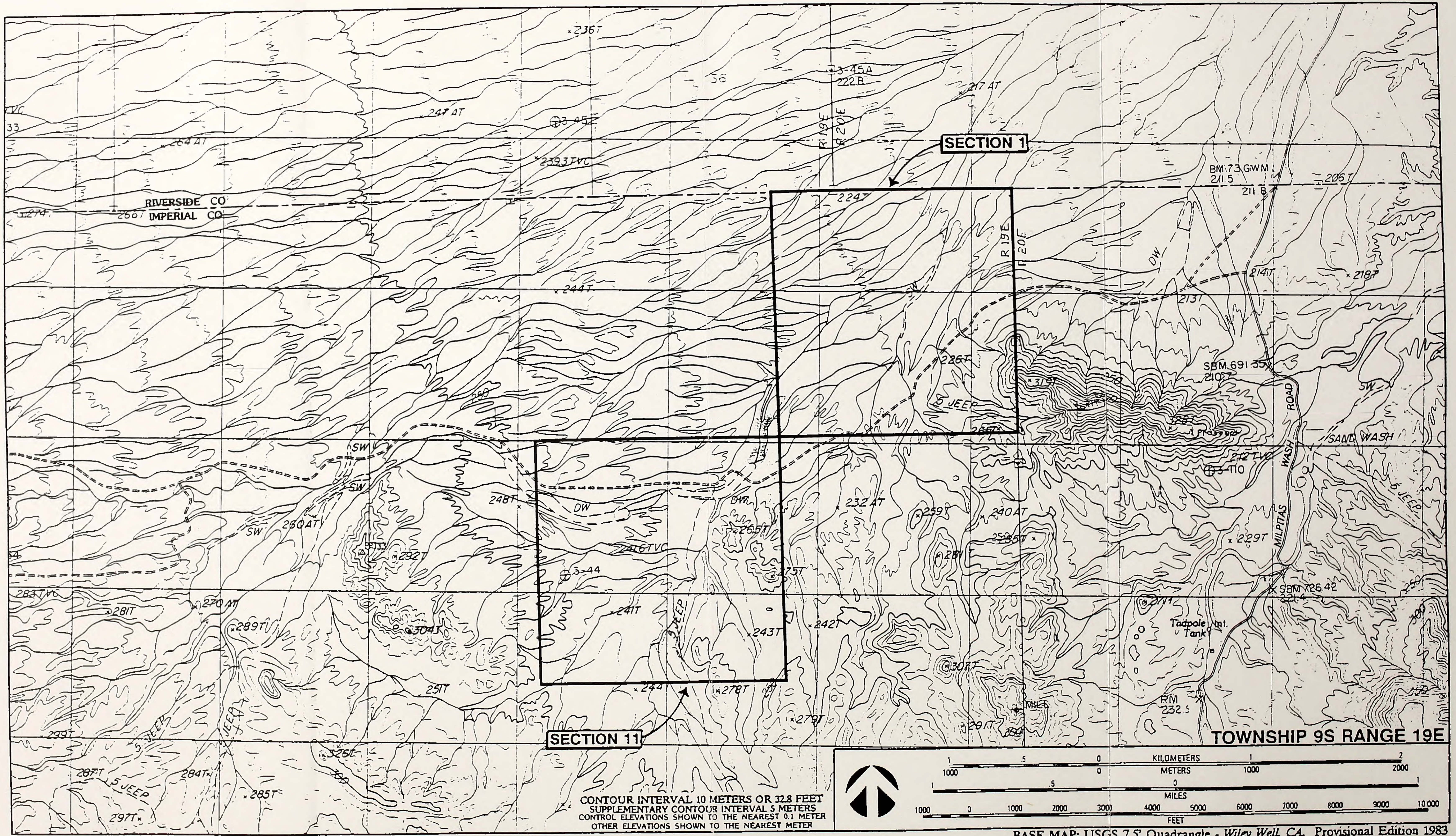
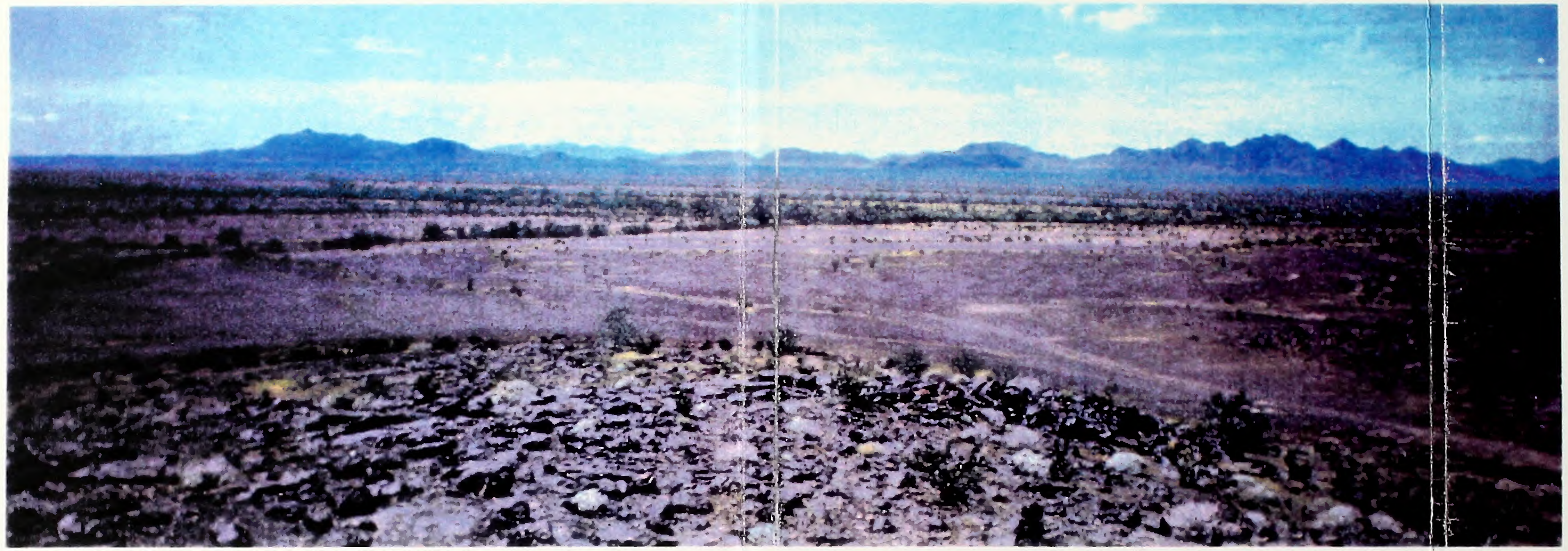


BASE MAP: USGS 7.5' Quadrangle - *Wiley Well, CA.* Provisional Edition 1983

FIGURE 6

GOSSER PROPERTY LOCATION
-SECTIONS 1 AND 11


A) View of Section 1, taken from southeast boundary looking northwest.

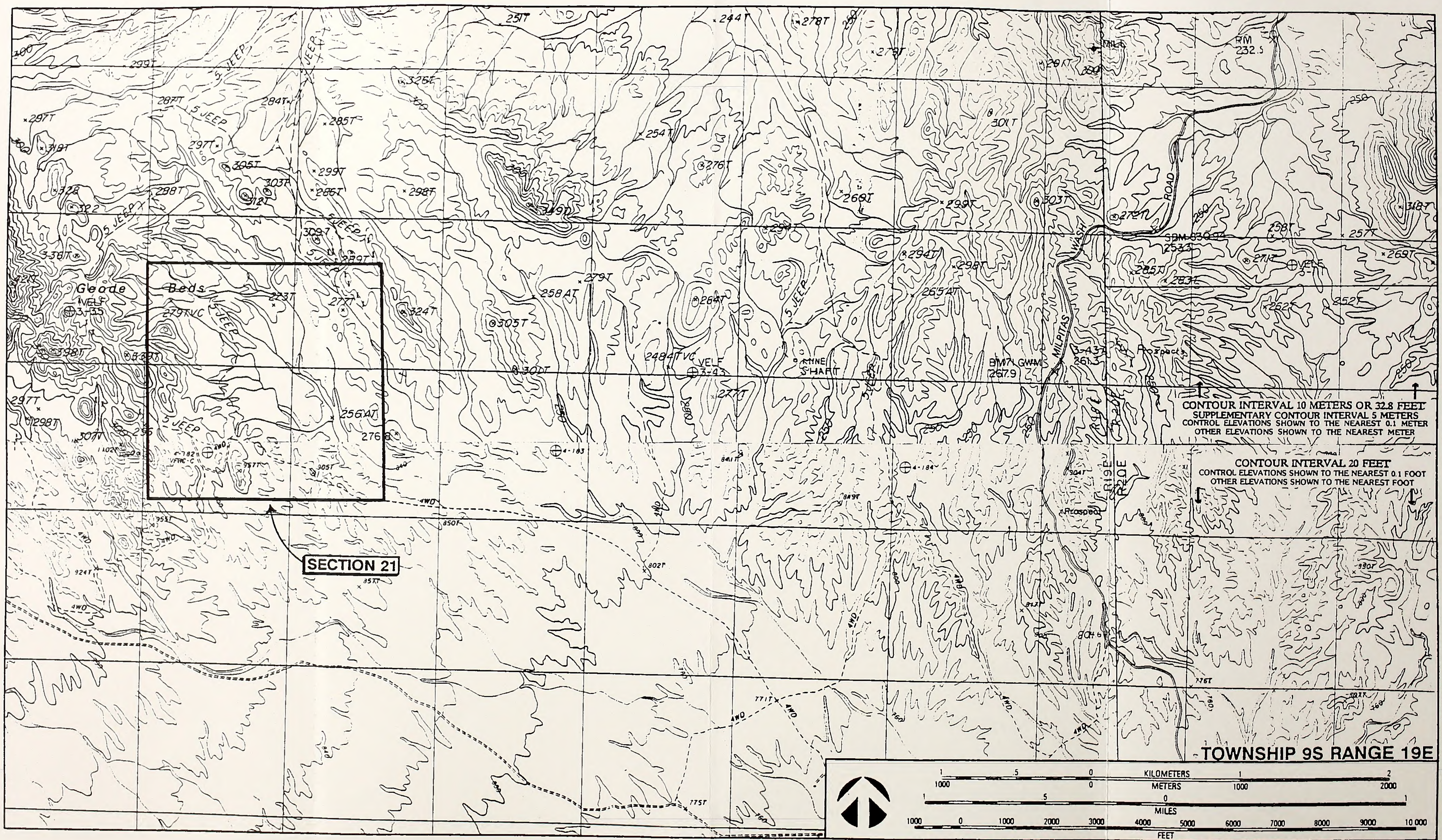

B) Desert dry wash scrub.


C) Sonoran creosote bush scrub.

A) View of Section 11, taken from eastern boundary looking northwest.

B) Drainage swale dominated by Sonoran creosote bush scrub.

C) Desert dry wash scrub.



BASE MAP: USGS 7.5' Quadrangles - *Wiley Well, CA.* Provisional Edition 1983 and *West of Palo Verde Peak, CA.* Provisional Edition 1988

FIGURE 9

GOSSER PROPERTY LOCATION -SECTION 21

sparsely vegetated. Additionally, there is a greater extent of "desert pavement" on this section (Figure 10b). There is some minor topographic relief along the southern and western boundaries. Species composition of microhabitats on Section 21 is generally the same as that occurring on Sections 1 and 11.

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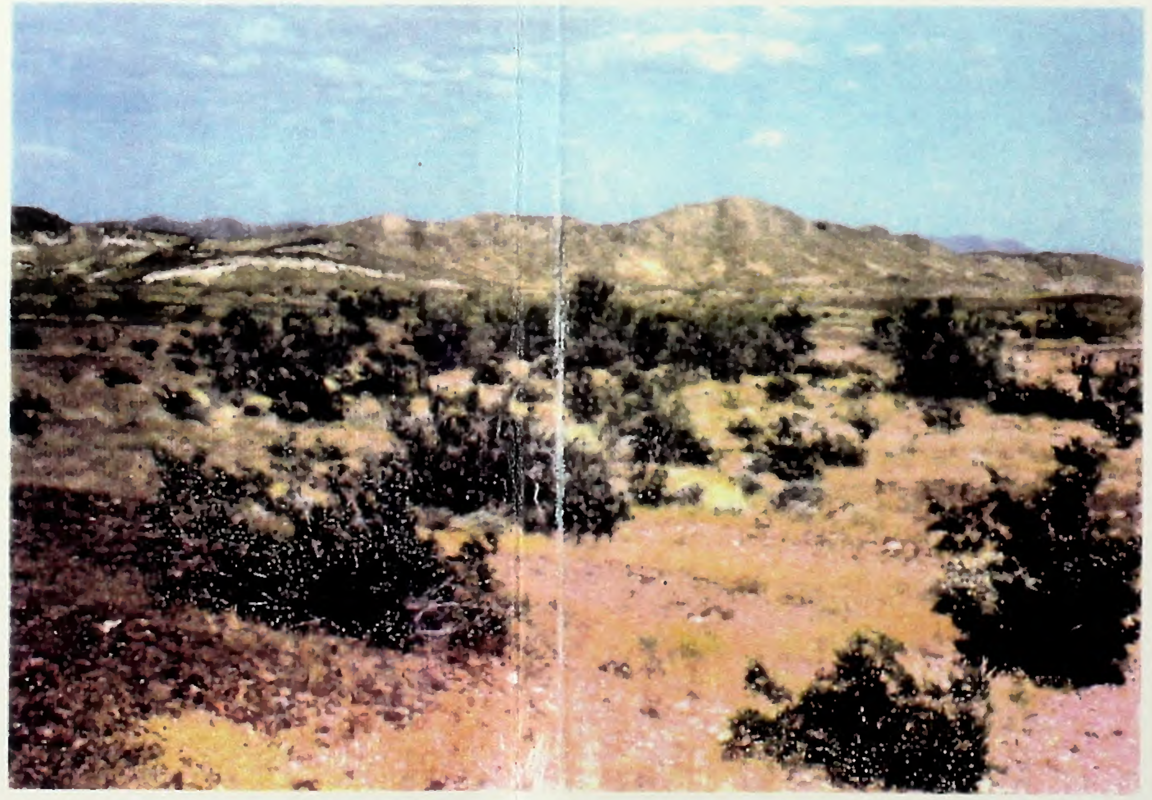
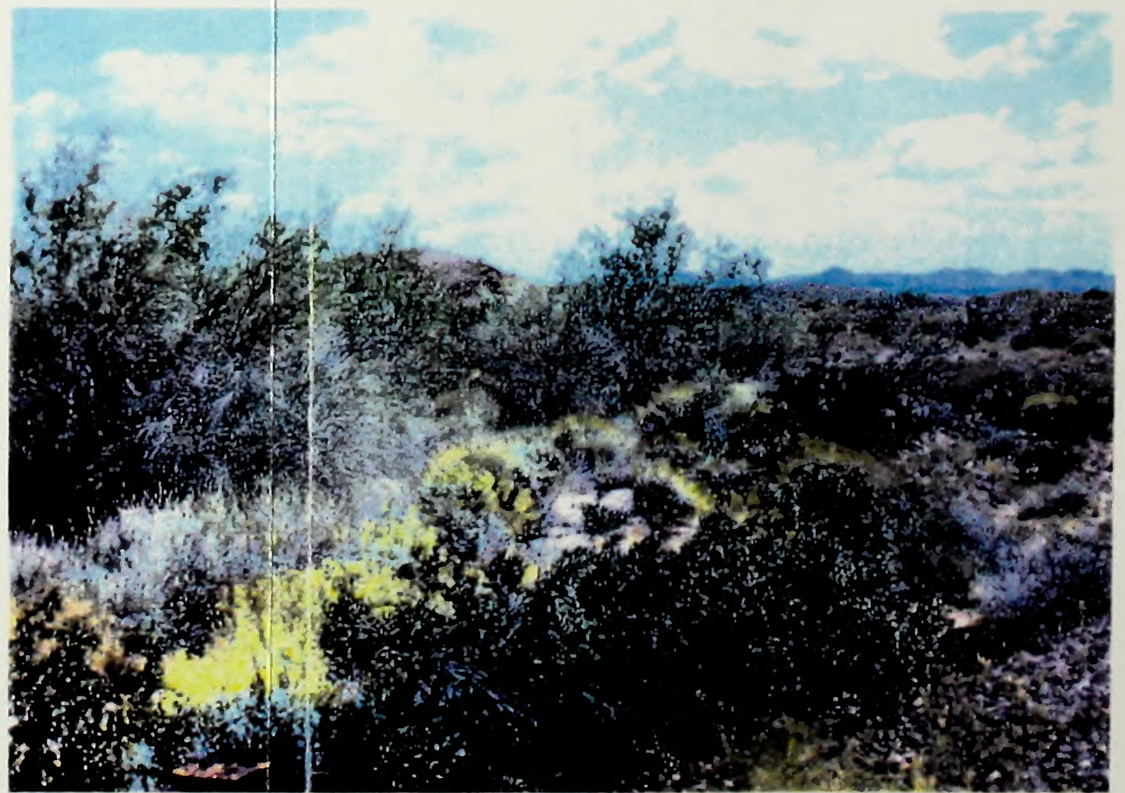
A) View of Section 21, taken from western boundary looking southeast.

B) Outcrop located along western boundary.



C) Sonoran creosote bush scrub.



D) Desert dry wash scrub.

SPECIAL-STATUS SPECIES

Special-status species are plants and animals that are legally protected under state and federal Endangered Species Acts or other regulations and species that are considered rare by the scientific community. Special-status species are defined for the purpose of this document to include species in the following categories:

- plants and animals that are listed or proposed for listing as rare, threatened or endangered under the California Endangered Species Act (California Department of Fish and Game 1991) of federal Endangered Species Act (50 CFR 17.11 for listed animals; 50 CFR 17.12 for listed plants; various notices in the Federal Register for proposed species);

- plants and animals that are Candidates (Category 1 or 2) for possible future listing as threatened or endangered under the federal Endangered Species Act (50 Federal Register 6184, February 21, 1990, for plants; 50 CFR Part 17, November 21, 1991, for animals);

- plant and animal species that meet the definition of rare or endangered pursuant to CEQA;

- plants occurring on Lists 1A, 1B, 2, 3, and 4 of the *California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of California* (Smith and Berg 1988). CDFG recognizes that Lists 1A, 1B, and 2 of the CNPS inventory contain plants that in the majority of cases would qualify for state listing, and CDFG requests their inclusion in EIR's as necessary. Plants occurring on CNPS Lists 3 and 4 are "plants about which we need more information", and "plants of limited distribution", respectively (Smith and Berg 1988), and may be included as special-status species on the basis of local significance or recent biological information;

- animals designated "Species of Special Concern" in California by CDFG (Remsen 1978, Williams 1986, CNDDB 1991); and

- animals species that are "fully protected" in California (California Fish and Game Code, Sections 3511, 4700, 5050, and 5515).

Prior to initiating field surveys, WESCO searched the 1991 CDFG Natural Diversity Data Base (Rarefind) records for known occurrences of special-status species in the vicinities of the parcels and the CNPS *Inventory of Rare and Endangered Vascular Plants of California* (Smith and Berg 1988). In addition, habitat requirements for each special-status plant and animal species identified by Rarefind as potentially occurring in the vicinity of the project was evaluated. Feasibility of the occurrence of these species on the site was determined based on this assessment, observations of the existing biological conditions on each property, and information on known populations in the vicinity.

In order to determine presence of special-status plant species, additional surveys would be necessary during their blooming periods. CDFG guidelines specify that sensitive plant surveys be conducted by a qualified botanist during the time of year when special-status plants possibly occurring on the site are both evident and identifiable. The guidelines also specify that surveys be: floristic in nature (i.e., every plant on the site identified to the level necessary to determine its rarity status); conducted in accordance with conservation ethics; and conducted using survey techniques that will assure a reasonable coverage of the site.

RIVERSIDE COUNTY SECTIONS

Plant Species

Habitat requirements were assessed for each of the 114 special-status plant species listed by CNPS in the rare plant inventory of all sensitive plant species known from Riverside County. Twenty-seven of these plant species were identified as potentially occurring on Sections 7 and 23 (Table 1). However, none of these species were observed during surveys. In order to determine presence of these species, surveys conducted during their blooming periods would be necessary. Based on the blooming periods of the species identified in Table 1, one survey each month from January to July would likely meet CDFG standards.

Animal Species

Thirteen special-status animals potentially occurring on Sections 7 and 23, their status, distribution, habitats, and occurrence are listed in Table 2. No special-status animals were observed during WESCO surveys. Most significant is the potential occurrence of Peninsular bighorn sheep, a state-listed threatened species. Both Sections 7 and 23 are located within the range of the Santa Rosa herd and provide suitable habitat for this species.

Table 1
Special-Status Plant Species Potentially Occurring
on the Gosser Properties in Riverside County
Sections 7 and 23

Common Name *Scientific Name*[1]	**Status**[2]	**Habitat**[3]	**Blooming Period**[4]
Munz's onion *Allium fimbriatum* var. *munz*	L1B/CT/C1	creosote bush scrub, 1,000'-2,000'	April-May
desert sand parsley *Ammoselin giganteum*	L2	occasional in basins, creosote bush scrub	March-April
Deep Canyon snapdragon *Antirrhinum cyathiferum*	L2	Mohave desert scrub	N/A
Providence Mtn. milk vetch *Astragalus nutans*	L4	desert mountains, 1,500'-6,400', creosote bush scrub	March-June
triple-ribbed milk vetch *Astragalus tricarinatus*	L1B/C2	gravelly washes and canyons, 1,500'-4,000', creosote bush scrub, foothills and desert mountains in Coachella Valley	February-May
ayenia *Ayenia compacta*	L2	occasional in dry rocky canyons below 1,500', creosote bush scrub	March-April
Cove's cassia *Cassia covesii*	L2	dry washes below 2,000', creosote bush scrub	April-June
crucifixion thorn *Castela emoryi*	L2	creosote bush scrub	N/A
Arizona spurge *Chamaesyce arizonica*	L2	creosote bush scrub	March-April
Las Animas colubrina *Colubrina californica*	L4	dry canyons below 3,000', creosote bush scrub, joshua tree wdlnd	April-May
foxtail cactus *Coryphanthaa vivipara* var. *alversonii*	L1B/C2	stoney slopes, 2,000'-5,000', creosote bush scrub, joshua tree wdlnd	May-June
ribbed cryptantha *Cryptantha costata*	L4	sandy/gravelly places below 1,500', creosote bush scrub	February-May
winged cryptantha *Cryptantha holoptera*	L4	gravelly/rocky places below 2,000',creosote bush scrub	March-April
Utah cynanchum *Cynanachum utahense*	L4	dry sandy places below 3,000', creosote bush scrub	April-June
California ditaxis *Ditaxis californica*	L1B/C2	sandy washes and alluvial fans, sonoran desert scrub, 400'-3,000', Santa Rosa Mountains	March-May and Oct-Dec
California barrel cactus *Ferocactus acanthodes* var. *acanthodes*	L3	rocky slopes and walls, gravelly fans below 5,000', creosote bush scrub, joshua tree wdlnd	April-May
little San Bernadino Mtns. gilia *Gilia maculata*	L1B/C2	sandy places, 500'-4,000', creosote bush scrub, joshua tree wdlnd	April-May
Parish's desert thorn *Lycium parishii*	L2	below 2,000', creosote bush scrub	N/A

Table 1 cont'd.

Common Name *Scientific Name*[1]	Status[2]	Habitat[3]	Blooming Period[4]
Parish's bush mallow *Malacothamnus parishii*	L1B/C2	1,000'-1,500', very rare, historic occurrence-San Bernadino Mtns.	June-July
Munz' cactus *Opuntia munzii*	L1B/C2	gravelly places, creosote bush scrub	May
Wiggin's cholla *Opuntia wigginsii*	L1B/C2	creosote bush scrub	N/A
Thurber's beardtongue *Penstemon thurberi*	L3	dry gravelly places 800'-5,100', creosote bush scrub, joshua tree wdlnd	May-June
Wright's phaseolus *Phaseolus wrightii*	L3	sonoran desert scrub	N/A
Thurber's pilostyles *Pilostyles thurberi*	L4	parasite on *Dalea* sp., creosote bush scrub	January
desert unicorn plant *Proboscidea althaeifolia*	L4	sandy places, creosote bush scrub	summer
desert sage *Salvia eremostachya*	L4	dry rocky and gravelly places, 1,200'-4,500', creosote bush scrub	March-May
Mecca aster *Xylorhiza cagnata*	L4	sonoran desert scrub	N/A

1 From Smith and Berg (1988).

2 Status categories:

- CT: California Threatened
- C2: Category 2 candidate for federal listing as threatened or endangered (data are insufficient at this time to support listing).
- C3c: Category 3 non-candidate for federal listing (plants previously considered candidates and included on past lists but too widespread or not threatened at this time).
- L1B: CNPS List 1B, a list of plants that are rare, threatened, or endangered in California and elsewhere. Plants on this list likely meet the biological criteria requiring them to be considered under CEQA.
- L2: CNPS List 2, plants rare, threatened, or endangered in California, but more common elsewhere. These plants are eligible for state listing.
- L3: CNPS List 3, a review of species about which more information is needed.
- L4: CNPS List 4, a "watch list" of plants of limited distribution.

3 From Smith and Berg (1988) and Munz and Keck (1968).

4 From Munz and Keck (1968).

Table 2

Special Status Animal Species Potentially Occurring on the Gosser Properties in Riverside County

Sections 7 and 23

Common Name *Scientific Name*[1]	Status[2]	Distribution[3]	Habitat[3]	Occurrence[4]
common chuckwalla *Sauromalus obesus*	C2	Throughout the Mohave and Colorado deserts from sea level to 4,125 feet.	Variety of desert habitats, but most frequently in creosote communities. Restricted to rocky areas.	No local records. Sections 7 and 23 are located on extreme western extent of its range. Potential habitat is present.
northern red diamond rattlesnake *Crotalus ruber ruber*	CSC/C2	Coastal San Diego County to the eastern slopes of the mountains and north through western Riverside County into southern San Bernardino County. Sea level to 3,000-ft elevation.	Wide variety of habitats in arid and semiarid habitats that provide dense vegetation or rocky cover.	No local records. Sections 7 and 23 are located on extreme eastern extent of its range. Potential habitat is present.
golden eagle *Aquila chrysaetos*	CSC	Permanent resident and migrant throughout California.	Typically rolling foothills, mountain areas, sage-juniper flats, and desert. Nests on cliffs and in trees.	No local records. Potential habitat is present. Likely to occur on at least an occasional basis.
prairie falcon *Falco mexicanus*	CSC	Permanent resident and migrant that ranges from southeastern deserts northwest along the inner coast Ranges and Sierra Nevada.	Primarily grasslands, savannahs, some agricultural fields, and desert scrub areas. Forages in open terrain; nests on cliffs, escarpments, and rock outcrops.	Several local nesting records. Although none were observed, foraging birds can be assumed to frequent both sections. Potential nesting habitat is also present, but more extensive on Section 23.
black-tailed gnatcatcher *Polioptila melanura*	CSC	Resident from Palm Springs and Joshua Tree National Monument south, and along the Colorado River. Generally below 1,000-ft elevation.	Desert wash habitat with dense mesquite, paloverde, ironwood, and acacia. Absent where introduced saltcedar dominates. Occurs sparingly in desert scrub.	Several local records, generally from below 500 feet. Potential habitat is present, however, likelihood of occurrence is low based on elevation, topography, and plant communities present.
loggerhead shrike *Lanius ludovicianus*	C2	Resident and winter visitor in lowlands and foothills throughout California.	Open habitats with sparse shrubs and trees, other suitable perches, bare ground, and low or sparse herbaceous cover.	No local records. Potential habitat is present.
California leaf-nosed bat *Macrotis californica*	CSC/C2	From Riverside, Imperial, San Diego, and San Bernardino counties south to the Mexican border.	Desert riparian, desert wash, desert scrub, desert succulent shrub, alkali desert scrub, and palm oasis. Roosts in rocky, rugged terrain with mines and caves. Forages over nearby flats and washes.	Reported from a cave near Torres, located east of the Santa Rosa Mountains. Potential habitat is present for this species.
spotted bat *Antrozous pallidus*	CSC/C2	One of North America's rarest mammals. Found at few localities in foothill, mountain, and desert regions of southern California.	From arid deserts and grasslands through mixed conifer forests. Prefers sites with roost sites such as cliffs. Feeds over water and along washes.	No local records. Potential habitat is present for this species.

Table 2 cont'd.

Common Name *Scientific Name*[1]	Status[2]	Distribution[3]	Habitat[3]	Occurrence[4]
Townsend's western big-eared bat *Plecotus townsendii townsendii*	CSC/C2	Throughout California, but distribution not well known. California records below 2,000 feet.	All but alpine and subalpine habitats. Prefers mesic habitats. Requires caves, mines, tunnels, or other man-made structures for roosting.	No local records. Potential habitat is present for this species.
pallid bat *Antrozous pallidus*	CSC	Occurs at low elevations throughout California, except for the northwest corner of the state.	Most common in open, dry habitats with rocky areas for roosting. Day roosts are in caves, crevices, and mines. Night roosts may be in more open sites.	No local records. Potential habitat is present for this species.
pocket free-tailed bat *Nyctinomus femorasaccus*	CSC	Riverside, San Diego, and Imperial counties.	Prefers desert rocky areas with high cliffs or rock outcrops.	No local records. Potential habitat is present for this species.
Colorado Valley woodrat *Neotoma albigula venusta*	•	Generally lowland desert areas in southeastern California.	Low-lying desert areas. Closely associated with beaver-tail cactus and mesquite.	Nearest records are from Mecca (180-ft elev), approximately 10 miles east, and from Dos Palmas Spring (3,500-ft elev.), approximately 8 miles northwest. Presence of beavertail cactus on Section 7 suggests potential occurrence of the woodrat. Potential occurrence on Section 23 is undetermined.
Peninsular bighorn sheep *Ovis canadensis cremnobates*	CT/C2 FSS	The Peninsular Ranges from the San Jacinto and Santa Rosa Ranges (Riverside Co.) south into Mexico.	Open areas of low-growing vegetation for foraging, with close proximity to steep, rugged terrain for escape, lambing, bedding, and adequate water source, and travel routes linking these areas.	Both Sections 7 and 23 lie within the range of the Santa Rosa Herd. Suitable habitat is present on both sections.

[1] Based on Calif. Fish and Game 77(3):109-141 1991.

[2] Status: CT = California Threatened
CSC = California Species of Special Concern
C2 = Federal Candidate for listing as threatened or endangered; Category 2
FSS = U. S. Forest Service Sensitive Species
• = 1) Taxa that are rare, restricted, or declining throughout their range; 2) population(s) in California which are threatened; or 3) taxa closely associated with rapidly declining habitats

[3] Distribution and habitat based on Zeiner et. al. 1990 and California Natural Diversity Database (RareFind 1991).

[4] Occurrence based on WESCO surveys (May 4-6, 1992) and California Natural Diversity Database (RareFind 1991) records.

IMPERIAL COUNTY SECTIONS

Plant Species

Habitat requirements were assessed for each of the 49 special-status plant species listed by CNPS in the rare plant inventory of all sensitive plant species known from Imperial County. Thirty of these plant species were identified as potentially occurring on the Sections 1, 11, and 21 (Table 3). However, none of these were observed during surveys. In order to determine presence of these species, surveys would be necessary during their blooming periods. Based on the blooming periods of the species identified in Table 1, one survey each month from December to July would likely meet CDFG standards.

Animal Species

Special-status animals known to Imperial County and potentially occurring on Sections 1, 11, and 21, as well as their status, habitat, and likelihood of occurrence are listed in Table 4. Species identified during WESCO surveys include the state threatened desert tortoise, the federal candidate (category 2) common chuckwalla and loggerhead shrike, and species of special concern including Crissal thrasher and black-tailed gnatcatcher. Although these species were not all observed on each section, occurrence is assumed based on site proximity and habitat similarity.

Table 3
Special-Status Plant Species Potentially Occurring on the Gosser Properties in Imperial County Sections 1, 11, and 21

Common Name *Scientific Name*[1]	**Status**[2]	**Habitat**[3]	**Blooming Period**[4]
Salton milk vetch *Astragalus crotalariae*	L4	sandy flats and desert fans, 220'-800', creosote bush scrub	Jan-April
Borrego milk vetch *Astragalus lentiginosus* var. *borreganus*	L4	dunes and sandy valley floors, 100'-800', creosote bush scrub	Feb-May
fairyduster *Calliandra eriophylla*	L2	sandy washes and gullies below 1,000'	Feb-March
Cove's cassia *Cassia covesii*	L2	dry washes below 2,000', creosote bush scrub	April-June
crucifixion thorn *Castela emoryi*	L2	creosote bush scrub	N/A
Arizona spurge *Chamaesyce arizonica*	L2	creosote bush scrub	March-April
Las Animas colubrina *Colubrina californica*	L4	dry canyons below 3,000', creosote bush scrub, joshua tree wdlnd	April-May
ribbed cryptantha *Cryptantha costata*	L4	sandy/gravelly areas below 1,500', creosote bush scrub	Feb.-May
winged cryptantha *Cryptantha holoptera*	L4	gravelly/rocky places below 2,000', creosote bush scrub	March-April
Utah cynanchum *Cynanchum utahense*	L4	dry sandy places below 3,000', creosote bush scrub	April-June
Parish's larkspur *Delphinium parishii* ssp. *subglobosum*	L4	dry stoney fans and slopes below 5,000', creosote bush scrub, chaparral, pinyon wdlnd	March-May
rock nettle *Eucnide rupestris*	L2	creosote bush scrub	April-June
California barrel cactus *Ferocactus acanthodes* var. *acanthodes*	L3/C3c	rocky slopes and walls, gravelly fans below 5,000', creosote bush scrub, joshua tree wdlnd	April-May
Baja California ipomopsis *Ipomopsis effusa*	L2	dry slopes, alluvial fan, creosote bush scrub	March-May
slender-leaved ipomopsis *Ipomopsis tenuifolia*	L2	rocky slopes 1,500'-3,500', creosote bush scrub	March-May
crown-of-thorns *Koeberlinia spinosa*	L2	creosote bush scrub	N/A
Mountain springs bush lupine *Lupinus excubitus* var. *medius*	L1B/C2	washes, creosote bush scrub	March-April

Table 3 cont'd.

Common Name *Scientific Name*[1]	Status[2]	Habitat[3]	Blooming Period[4]
Parish's desert-thorn *Lycium parishii*	L2	below 2,000', creosote bush scrub	March-April
Coulter's lyrepod *Lyrocarpa coulteri* var. *palmeri*	L4	among rocks and in canyons below 2,000', creosote bush scrub	Dec.-April
brown turbans *Malperia tenuis*	L2	sandy places, creosote bush scrub	March-April
hairy stickleaf *Mentzelia hirsutissima* var. *stenophylla*	L2	sandy places 800'-2,300', creosote bush scrub, mtn springs region	April-May
long-lobed four-o'-clock *Mirabilis tenuiloba*	L4	rocky slopes below 1,500', creosote bush scrub	March-May
Munz' cactus *Opuntia munzii*	L1B/C2	gravelly places, creosote bush scrub	May
Wiggin's cholla *Opuntia wigginsii*	L1B/C2	creosote bush scrub	N/A
Thurber's beardtongue *Penstemon thurberi*	L3	dry gravelly places 800'-5,100' creosote bush scrub, joshua tree wdld	May-June
sand food *Pholisma sonorae*	L1B/C2	parasite on the roots of *Coldenia* sp., creosote bush scrub, joshua tree wdlnd	April-July
Thurber's pilostyles *Pilostyles thurberi*	L4	parasite on *Dalea* sp., creosote bush scrub	January
desert unicorn plant *Proboscidea althaefolia*	L4	sandy places, creosote bush scrub	summer
Orocopia sage *Salvia greatai*	L1B/C2	dry washes and fans below 600', creosote bush scrub	March-April
Orcutt's woody aster *Xylorhiza orcuttii*	L1B/C2	gypsum soil of canyons below 1,000', creosote bush scrub	March- April

1 From Smith and Berg (1988).

2 Status categories:

- C2: Category 2 candidate for federal listing as threatened or endangered (data are insufficient at this time to support listing).
- C3c: Category 3 non-candidate for federal listing (plants previously considered candidates and included on past lists but too widespread or not threatened at this time).
- L1B: CNPS List 1B, a list of plants that are rare, threatened, or endangered in California and elsewhere. Plants on this list likely meet the biological criteria requiring them to be considered under CEQA.
- L2: CNPS List 2, plants rare, threatened, or endangered in California, but more common elsewhere. These plants are eligible for state listing.
- L3: CNPS List 3, a review of species about which more information is needed.
- L4: CNPS List 4, a "watch list" of plants of limited distribution.

3 From Smith and Berg (1988) and Munz and Keck (1968).

4 From Munz and Keck (1968).

Table 4
Special Status Animal Species Potentially Occurring on the Gosser Properties in Imperial County
Sections 1, 11, and 21

Common Name *Scientific Name*[1]	Status[2]	Distribution[3]	Habitat[3]	Occurrence[4]
Couch's spadefoot *Scaphiopus couchi*	C2	Along the Arizona border in Imperial, Riverside, and San Bernardino counties.	Desert washes, desert riparian, palm oasis, desert succulent scrub, and desert scrub habitats. Requires friable soil for burrowing and temporary pools that persist more than 10-12 days for breeding.	No local records. Potential habitat is present throughout this area. Evidence of small temporary pools was observed in desert washes (bedrock substrate).
desert tortoise *Gopherus agassizii*	CT/FT BSS	Throughout the Mohave and Colorado deserts from below sea level to 4130 feet or higher.	Wide variety of habitats in arid and semiarid regions. Requires friable soil for burrow and nest construction.	Present. Burrows observed on Sections 1, 11, and 21. Two adults (male and female) observed 1/4 mile east of Section 1.
common chuckwalla *Sauromalus obesus*	C2	Throughout the Mohave and Colorado deserts from sea level to 4125 feet.	Variety of desert habitats, but most frequently in creosote communities. Restricted to rocky areas.	Present, however habitat is limited in extent. One juvenile observed in rocky outcrop on Section 21; assumed present in similar habitat on sections 1 and 11.
golden eagle *Aquila chrysaetos*	CSC	Permanent resident and migrant throughout California.	Typically rolling foothills, mountain areas, sage-juniper flats, and desert. Nests on cliffs and in trees.	No local records. Potential habitat is present. Likely to occur on at least an occasional basis.
ferruginous hawk *Buteo regalis*	C2	Winter resident and migrant at lower elevations.	Requires large, open tracts of grasslands, sparse shrub, or desert habitats.	No local records. Potential wintering habitat is present. Likely to occur on at least a rare or occasional basis.
prairie falcon *Falco mexicanus*	CSC	Permanent resident and migrant that ranges from southeastern deserts northwest along the inner coast Ranges and Sierra Nevada.	Primarily grasslands, savannahs, some agricultural fields, and desert scrub areas. Forages in open terrain; nests on cliffs, escarpments, and rock outcrops.	Nesting record in the Black Hills located 2.5 miles west of Section 21. All three sections lie within the foraging radius of this and likely other nesting locations.
burrowing owl *Athene cunicularia*	CSC	Permanent resident in appropriate habitats throughout the state.	Resident of open, dry grassland and desert habitats. Requires burrows for cover and nesting.	No local records. Potential habitat is present for the owl.
gila woodpecker *Melanerpes uropygialis*	SE	Resident along the Colorado River, and locally near Brawley. May wander in nonbreeding season.	Mostly in desert riparian and desert wash habitats.	No local records. Unlikely to occur based on known distribution. However, desert washes provide potential habitat for a rare visitor during the nonbreeding season.
Crissal thrasher *Toxostoma dorsale*	CSC	Resident of southeastern deserts. Fairly common in Colorado River Valley, but local and uncommon elsewhere.	Dense thickets in desert riparian and desert wash habitats.	Present. Two pairs with fledglings observed in desert wash thickets on Section 1. Presence on Sections 11 and 21 is assumed based on this observation and local (Milpitas Wash) CNDDB records.

Table 4 cont'd.

Common Name *Scientific Name*[1]	Status[2]	Distribution[3]	Habitat[3]	Occurrence[4]
Le Conte's thrasher *Toxostoma lecontei*	CSC	Local resident in southern deserts from Inyo County south to the Mexican border, and in southern and western San Joaquin County.	Desert washes and flats with scattered shrubs and large areas of open, sandy, or alkaline terrain in desert wash, desert scrub, alkali desert scrub, and desert succulent shrub habitats.	Potential habitat is present and the thrasher is likely to occur. Has been reported approximately 10 miles to the southeast, along Milpitas Wash.
black-tailed gnatcatcher *Polioptila melanura*	CSC	Resident from Palm Springs and Joshua Tree National Monument south, and along the Colorado River.	Desert wash habitat with dense mesquite, paloverde, ironwood, and acacia. Absent where introduced saltcedar dominates.	Present. Observed in desert wash habitat of Sections 1 and 11. Assumed present on Section 21. CNDDB reports several local records.
loggerhead shrike *Lanius ludovicianus*	C2	Resident and winter visitor in lowlands and foothills throughout California.	Open habitats with sparse shrubs and trees, other suitable perches, bare ground, and low or sparse herbaceous cover.	Present. Observed on each section.
cave myotis *Myotis velifer*	CSC	Restricted, in California, to lowlands of Colorado River drainage and adjacent mountain ranges, in San Bernardino, Riverside, and Imperial counties.	Desert scrub, desert succulent shrub, desert wash, and desert riparian habitats. A colonial cave dweller that also uses mines and buildings. Feeds in vicinity of riparian vegetation and water.	Potential foraging habitat is present. Nearest record is from the Mule Mountains (Stonehouse Mine), located approximately 13 miles northeast of Section 1.
California leaf-nosed bat *Macrotis californica*	CSC/C2	From Riverside, Imperial, San Diego, and San Bernardino counties south to the Mexican border.	Desert riparian, desert wash, desert scrub, desert succulent shrub, alkali desert scrub, and palm oasis. Roosts in rocky, rugged terrain with mines and caves. Forages over nearby flats and washes.	Potential foraging habitat is present. Nearest record is from the Mule Mountains (Roosevelt and Stonehouse Mines), located approximately 10-13 miles northeast of Section 1.
spotted bat *Euderma maculatum*	CSC/C2	One of North America's rarest mammals. Found at few localities in foothill, mountain, and desert regions of southern California.	From arid deserts and grasslands through mixed conifer forests. Prefers sites with roost sites such as cliffs. Feeds over water and along washes.	No local records. Potential habitat is present for this species.
Townsend's western big-eared bat *Plecotus townsendii townsendii*	CSC/C2	Throughout California, but distribution not well known. California records below 2,000 feet.	All but alpine and subalpine habitats. Prefers mesic habitats. Requires caves, mines, tunnels, or other man-made structures for roosting.	No local records. Potential habitat is present for this species.
pallid bat *Antrozous pallidus*	CSC	Occurs at low elevations throughout California, except for the northwest corner of the state.	Most common in open, dry habitats with rocky areas for roosting. Day roosts are in caves, crevices, and mines. Night roosts may be in more open sites.	No local records. Potential habitat is present for this species.
pocket free-tailed bat *Nyctinomus femorasaccus*	CSC	Riverside, San Diego, and Imperial counties.	Prefers desert rocky areas with high cliffs or rock outcrops.	No local records. Potential habitat is present for this species.

Table 4 cont'd.

Common Name *Scientific Name*[1]	Status[2]	Distribution[3]	Habitat[3]	Occurrence[4]
southern grasshopper mouse *Onchyomys torridus ramona*	C2	Arid habitats of southern California and the southern Central Valley.	Desert areas, especially scrub habitats with friable soils for digging.	No local records. Potential habitat is present for this species.
Colorado Valley woodrat *Neotoma albigula venusta*	*	Lowland desert areas in southeastern California.	Low-lying desert areas. Closely associated with beaver-tail cactus and mesquite.	Nearest record is from Riverside County, approximately 10 miles northeast of Section 1. Woodrat nests observed in desert wash habitat of Section 21. Trapping would be necessary to determine species
American badger *Taxidea taxus*	CSC	Throughout most of the state, except in the northern North Coast area.	Herbaceous, shrub, and open stages of most habitats with dry, friable soils.	No local records. Potential habitat is present for the badger.

[1]Based on Calif. Fish and Game 77(3):109-141 1991.

[2]Status: CE = California Endangered
CT = California Threatened
CSC = California Species of Special Concern
FT = Federal Threatened
C2 = Federal Candidate for listing as threatened or endangered; Category 2
BSS = Bureau of Land Management Sensitive Species
* = 1) Taxa that are rare, restricted, or declining throughout their range; 2) population(s) in California which are threatened; or 3) taxa closely associated with rapidly declining habitats

[3]Distribution and habitat based on Zeiner et. al. 1990 and California Natural Diversity Database (RareFind 1991).

[4]Occurrence based on WESCO surveys (May 4-6, 1992), and California Natural Diversity Database (RareFind 1991) records.

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APPENDIX A1

Appendix A1

Plant Species Identified on the Gosser Properties
Riverside County, Sections 7 and 23
May 6, 1992[1]

SCIENTIFIC NAME	COMMON NAME
Acacia greggii	cats claw
Agave deserti	desert agave
Ambrosia dumosa	burrobush
Atriplex hymenelytra	desert holly
Baileya pleniradiata	wooly marigold
Chaenactis fremontii	pincushion
Chorizanthe brevicornu	brittle spine flower
Cryptantha sp.	popcorn flower
Encelia farinosa	brittlebrush
Ephedra californica	squaw tea
Eriogonum deflexum	skeleton weed
Eriogonum pusillum	yellow turban
Eriogonum inflatum	desert trumpet
Fagonia chilensis laevis	smooth stemmed fagonia
Ferocactus acanthodes	barrel cactus
Fouquieria splendens	ocotillo
Hoffmannseggia microphylla	small leaved hoffmannseggia
Hymenoclea salsola	cheesebush
Krameria grayi	white ratany
Larrea divaricata	creosote bush
Lepidium sp.	pepper grass

Appendix A1 cont'd.

SCIENTIFIC NAME	COMMON NAME
Lupinus sp.	lupine
Malvastrum rotundifoliim	desert five spot
Mohavea confertifolia	ghost flower
Monoptilon bellioides	desert star
Opuntia basilaris	beavertail cactus
Opuntis bigelovii	jumping cholla
Phacelia parryi	Parry's phacelia
Spheralcea ambigua	desert mallow
Trichoptilium incisum	yellow heads

1 Due to limited surveys, this, this list represents only a small number of species occurring on Section 7 and likely to occur on Section 23.

APPENDIX A2

Appendix A2

Plant Species Identified on the Gosser Properties
Imperial County, Sections 1, 11, and 21
May 4 and 5, 1992[1]

SCIENTIFIC NAME	COMMON NAME
Acacia greggii	cats claw
Ambrosia dumosa	burrobush
Atriplex hymenelytra	desert holly
Baileya pleniradiata	wooly marigold
Cercidium floridum	palo verde
Chaenactis fremontii	pincushion
Chilopsis linearis	desert willow
Chorizanthe corrugata	corrugata
Chorizanthe brevicornu	brittle spine flower
Cryptantha sp.	popcorn flower
Dalea spinosa	smoke tree
Encelia farinosa	brittlebrush
Ephedra californica	squaw tea
Eriogonum deflexum	skeleton weed
Eriogonum pusillum	yellow turban
Eriogonum inflatum	desert trumpet
Euphorbia polycarpa	sand mat
Fagonia chilensis laevis	smooth stemmed fagonia
Ferocactus acanthodes	barrel cactus
Fouquieria splendens	ocotillo
Gilia setosissima	bristly gilia

Appendix A2 cont'd.

SCIENTIFIC NAME	COMMON NAME
Hilaria rigida	galeta grass
Hymenoclea salsola	cheesebush
Krameria grayi	white ratany
Larrea divaricata	creosote bush
Lepidium sp.	pepper grass
Malvastrum rotundifoliim	desert five spot
Mentzelia involucrata	sand blazing star
Mohavea confertifolia	ghost flower
Monoptilon bellioides	desert star
Nicotiana trigonophylla	desert tobacco
Opuntia ramosissima	pencil cholla
Opuntia basilaris	beavertail cactus
Perityle emoryi	rock daisy
Phacelia parryi	Parry's phacelia
Phoradendron californicum	mistletoe
Plantago sp.	plantain
Rafinesqua neomexicana	desert chicory
Sarcostemma hirtellum	climbing milkweed
Spheralcea ambigua	desert mallow
Trichoptilium incisum	yellow heads

1 Due to limited surveys, this list represents only a small number of species occurring on Sections 1, 11, and 21.

APPENDIX B1

Appendix B1

Animal Species Identified on the Gosser Property
Riverside County, Section 7
May 6, 1992[1]

COMMON NAME[2]	SCIENTIFIC NAME[2]
long-tailed brush lizard	*Urosaurus graciosus*
desert horned lizard	*Phrynosoma platyrhinos*
western whiptail	*Cnemidophorus tigris*
mourning dove	*Zenaida macroura*
Anna's hummingbird	*Calypte anna*
ash-throated flycatcher	*Myiarchus cinerascens*
rock wren	*Salpinctes obsoletus*
black-chinned sparrow	*Spizella atrogularis*
house finch	*Carpodacus mexicanus*
pocket mouse	*Perognathus* sp.[3]
kangaroo rat	*Dipodomys* sp.[3]
coyote	*Canis latrans*

[1]Due to limited surveys, this list represents only a small number of species occurring on Section 7 and likely to occur on Section 23.

[2]Based on Calif. Fish and Game 77(3):109-141 1991.

[3]Based on the presence of burrows.

APPENDIX B2

Appendix B2

Animal Species Identified on the Gosser Properties
Imperial County, Sections 1, 11, and 21
May 4 and 5, 1992[1]

COMMON NAME[2]	SCIENTIFIC NAME[2]
desert tortoise[3]	*Gopherus agassizii*
desert iguana	*Dipsosaurus dorsalis*
common chuckwalla	*Sauromalus obesus*
zebra-tailed lizard	*Callisaurus draconoides*
long-nosed leopard lizard	*Gambelia wislizenii*
long-tailed brush lizard	*Urosaurus graciosus*
desert horned lizard	*Phrynosoma platyrhinos*
western whiptail	*Cnemidophorus tigris*
turkey vulture	*Cathartes aura*
Gambel's quail	*Callipepla gambelii*
mourning dove	*Zenaida macroura*
common poorwill	*Phalaenoptilus nuttallii*
Anna's hummingbird	*Calypte anna*
Costa's hummingbird	*Calypte costae*
ash-throated flycatcher	*Myiarchus cinerascens*
western kingbird	*Tyrannus verticalis*
verdin	*Auriparus flaviceps*
rock wren	*Salpinctes obsoletus*
black-tailed gnatcatcher	*Polioptila melanura*
northern mockingbird	*Mimus polyglottus*
Crissal thrasher	*Toxostoma crissale*

Appendix B2 cont'd.

COMMON NAME[2]	SCIENTIFIC NAME[2]
phainopepla	*Polioptila melanura*
loggerhead shrike	*Lanius ludovicianus*
Grace's warbler[4]	*Dendroica graciae*
black-chinned sparrow	*Spizella atrogularis*
house finch	*Carpodacus mexicanus*
Audubon's cottontail	*Sylvilagus audobonii*
black-tailed jackrabbit	*Lepus californicus*
pocket mouse[3]	*Perognathus* sp.
Merriam kangaroo rat[3]	*Dipodomys* merriami
desert kangaroo rat[3]	*Dipodomys deserti*
woodrat[3]	*Neotoma* sp.
kit fox[3]	*Vulpes macrotis*
coyote[3]	*Canis latrans*
desert mule deer[3]	*Odocoileus hemionus crooki*

[1]Due to limited surveys, this list represents only a small number of species occurring on Sections 1, 11, and 21.

[2]Based on Calif. Fish and Game 77(3):109-141 1991.

[3]Based on the presence of sign (i.e. burrows, nests, tracks, or scat).

[4]Vagrant

MESQUITE REGIONAL LANDFILL EIS/EIR

APPENDIX D-3

BIOLOGICAL INVENTORY FOR MESQUITE REGIONAL LANDFILL DESERT TORTOISE SURVEYS

MARCH 1994

BIOLOGICAL INVENTORY FOR MESQUITE REGIONAL LANDFILL

DESERT TORTOISE SURVEYS

FINAL REPORT

Submitted to:

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March 1994
(Originally Submitted July 1992)

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SUMMARY

Arid Operations proposes to construct and operate a landfill in Imperial County, California. The proposed landfill would occupy approximately one square mile of land adjacent to Gold Fields Operating Co.'s (GFOC) existing gold mining operation (plus portions of land inside the fenced mine boundary) and would be serviced by a four- to five-mile long rail spur from the existing Southern Pacific Railroad track at Glamis and an access road from Highway 78.

An expanded area, comprising approximately 1.25 square miles outside of the Mesquite Mine fence, plus 0.3 square miles inside the mine and a 4.5-mile-long, 500-foot-wide rail spur alignment were surveyed to estimate impacts to tortoises from construction and operation of the landfill. In consultation with the U.S. Fish and Wildlife Service, it was determined that areas inside the fence had been previously adequately surveyed for the purpose of estimating impacts.

A total of 83 definite and questionable tortoise sign was found during the surveys, 63 on the planned facility site and 20 on the rail spur alignment and associated zone-of-influence transects. As a result of comparison with sign levels during an intensive survey on a nearby section of like habitat, an estimate of approximately 15 tortoises >140mm in length is suggested for sections 7, 15, and 19. For the benefit of this federally-listed species, this estimate would be appropriate on Section 18 and the rail spur alignment also, despite the degraded habitat.

The nearest core tortoise population is the Chuckwalla Bench population, approximately 30 miles northwest, over the Chocolate Mountains. The proposed landfill essentially lies at the periphery of this population. Importantly, no critical corridors connecting core populations or vital habitats are represented by this site, and successful mitigation measures will ameliorate any population fragmentation which might occur as a result of the construction of this facility.

DESERT TORTOISE SURVEYS

1.0 INTRODUCTION

1.1 Background of the Proposed Project

Arid Operations proposes to construct and operate a landfill in Imperial County, California. The proposed landfill would occupy approximately one square mile of land adjacent to Gold Fields Operating Co.'s (GFOC) existing gold mining operation, plus portions of land inside the fenced mine boundary, and would be serviced by a single four- to five-mile long rail spur from the existing Southern Pacific Railroad track at Glamis and an access road from Highway 78.

1.2 Biological Resources - Desert Tortoise

The desert tortoise, *Gopherus agassizii*, is a species of special concern inhabiting the proposed site. The desert tortoise is a federally-listed Threatened species (Federal Register 12178, 2 April 1990) in California, Nevada, Utah, and parts of Arizona and a California state-listed Threatened species (California Fish and Game Commission, Section 670.5, 22 June 1989). In accordance with the Endangered Species Act of 1973 as amended (50 CFR, Part 17), developers must supply adequate data to the U.S. Fish and Wildlife Service (FWS) on impacts to tortoises from proposed development such that the FWS can issue a Biological Opinion regarding jeopardy to the species and necessary mitigation. Under the California Endangered Species Act of 1985 (Chapter 1240, Stat. 1984), such data must also be supplied to the California Department of Fish and Game for their review and issuance of a Biological Opinion.

The desert tortoise is one of four species of tortoises belonging to the genus *Gopherus*, all of which inhabit North America: *G. agassizii* (desert tortoise), *G. berlandieri* (Texas tortoise), *G. flavomarginatus* (Bolson tortoise), and *G. polyphemus* (gopher tortoise). Only the desert tortoise inhabits the southwest, with a current range extending from southwestern Utah, west to the Sierra Nevada Range in California and south into Mexico (Stebbins 1985).

The desert tortoise occupies arid habitats below approximately 4000 feet in elevation (Karl 1983, Stebbins 1985). Common vegetation associations in the Mojave Desert include creosote bush scrub, saltbush scrub, Joshua tree woodland, and Mojave yucca communities. In the Colorado Desert of southern California and Arizona, desert tortoises occupy somewhat lusher desert habitats, with increased bunch grasses, cacti, and trees, commonly palo verde-mixed cacti associations (Burge 1979, Vaughn 1985). Because of the burrowing nature of tortoises, soil type is an important habitat component (Karl 1983, Weinstein *et al.* 1986). In California, tortoises typically inhabit soft sandy loams and loamy sands, although they are also found on non-talus, rocky slopes which provide natural coversites in openings between rocks (Karl 1988, 1989a and field notes). Throughout their range, tortoises appear to be opportunistic in their burrowing habits, burrowing into hillsides and utilizing rock caverns where available, and altering the burrows of other burrowing species, such as kit and gray foxes, rodents, and hares. Pallets (forms) and burrows are the most common form of shelter utilized by tortoises west of Nevada. Pallets are mere forms, usually under a bush, with only the anterior edge of the form exhibiting digging. Burrows are longer, extending to several feet deep and dug at a gentle angle; vertical depths below the soil surface at the end of a burrow are typically less than a meter (Burge 1978, Karl, unpub. field notes).

Desert tortoises are active from approximately early March through early June and between September and early November (Marlow 1979). Tortoises are essentially inactive during the hot summer months when succulent forage is unavailable and ambient temperatures typically exceed lethal levels. Tortoises then remain sequestered in burrows except during periods of rain, when they exit burrows to replenish bodily water stores. Tortoises are entirely diurnal (although some reports have been made of nocturnal activity), remaining active above ground between ambient temperatures of approximately 18 and 43°C (Karl, unpub. data).

Desert tortoises are herbivorous, although they have been observed eating soil and, occasionally, canid scat. Forage typically comprises annuals and succulent perennials, including cacti and perennial grasses.

1.3 Previous Surveys

Several previous desert tortoise surveys have been conducted on and adjacent to the mine site (see Environmental Solutions, Inc. [ESI] 1991 for review and original documents). These include 48 triangular transects in 1984 (Nicholson 1984) and 1987, a search for desert tortoise sign on Section 16 (Tierra Madre Consultants, Inc. 1990), and a tortoise clearance on the western one-half of Section 16 (Karl, 1992a). In general, tortoise densities were found to be low, mostly less than 20 tortoises per square mile; the Section 16 clearance yielded 7 breeding-age tortoises in 0.5 square miles.

2.0 SITE DESCRIPTION

2.1 Location

The planned landfill is located in Township 13 South, Range 19 East, sections 7 (southwestern quarter), 15 (northwestern third), 18 (western half), and 19 (western third) (Figure 1). The 500-foot-wide rail spur alignment is in Range 18 East and extends for approximately 4.5 miles from the western edge of sections 18 and 19, southwest through sections 13, 24, 23, 27 and 28.

2.2 Habitat

Section 7 - The southwestern quarter of Section 7 is gently undulating, with incised washes generally less than a yard deep. These washes are dominated by two tree species - palo verde (*Cercidium floridum*) and ironwood (*Olneya tesota*)- and several shrub species - brittlebush (*Encelia farinosa*), desert straw (*Stephanomeria pauciflora*), and cheesebush (*Hymenoclea salsola*). The 50- to 100-foot-wide open spaces between the washes are sparsely-vegetated basaltic gravel pavements with scattered cobbles over gravelly sandy loam. Creosote bush (*Larrea tridentata*), burrobush (*Ambrosia dumosa*), and brittlebush are the aspect dominant shrubs, with scattered ocotillo (*Fouquieria splendens*). Cambess (*Oligomeris linifolia*), rigid spiny-herb (*Chorizanthe rigida*), plantain (*Plantago insularis*), forget-me-not (*Cryptantha* spp.), and Arabian grass (*Schismus arabicus*) are the most common annuals, especially in the open areas. On the western edge of Section 7 are several barren areas and graded areas associated with a current gravel operation.

Section 15 - The habitat is similar to most of the native habitat in the local area, although somewhat more lush than sections to the west. A few shallow (<4 feet deep) gallery washes with moderately dense ironwood, palo verde, creosote bush, and brittlebush, and common burrobush, big galleta (*Hilaria rigida*), and jojoba (*Simmondsia chinensis*) intersect the moderately flat bajada. Many smaller, shallow washes, with fewer arboreal elements, cross the site. Between the washes are large patches of basaltic and granitic gravel pavement with scattered cobbles. The vegetation on the pavement is sparse creosote bush, burrobush, and brittlebush. In general, the ephemeral vegetation is fairly diverse, but dominated by cambess, rigid spiny-herb, plantain, forget-me-not, and Arabian grass, especially in the open areas. The surveyed portion of Section 15 lies immediately inside the southeastern mine boundary; however, the cyanide leaching

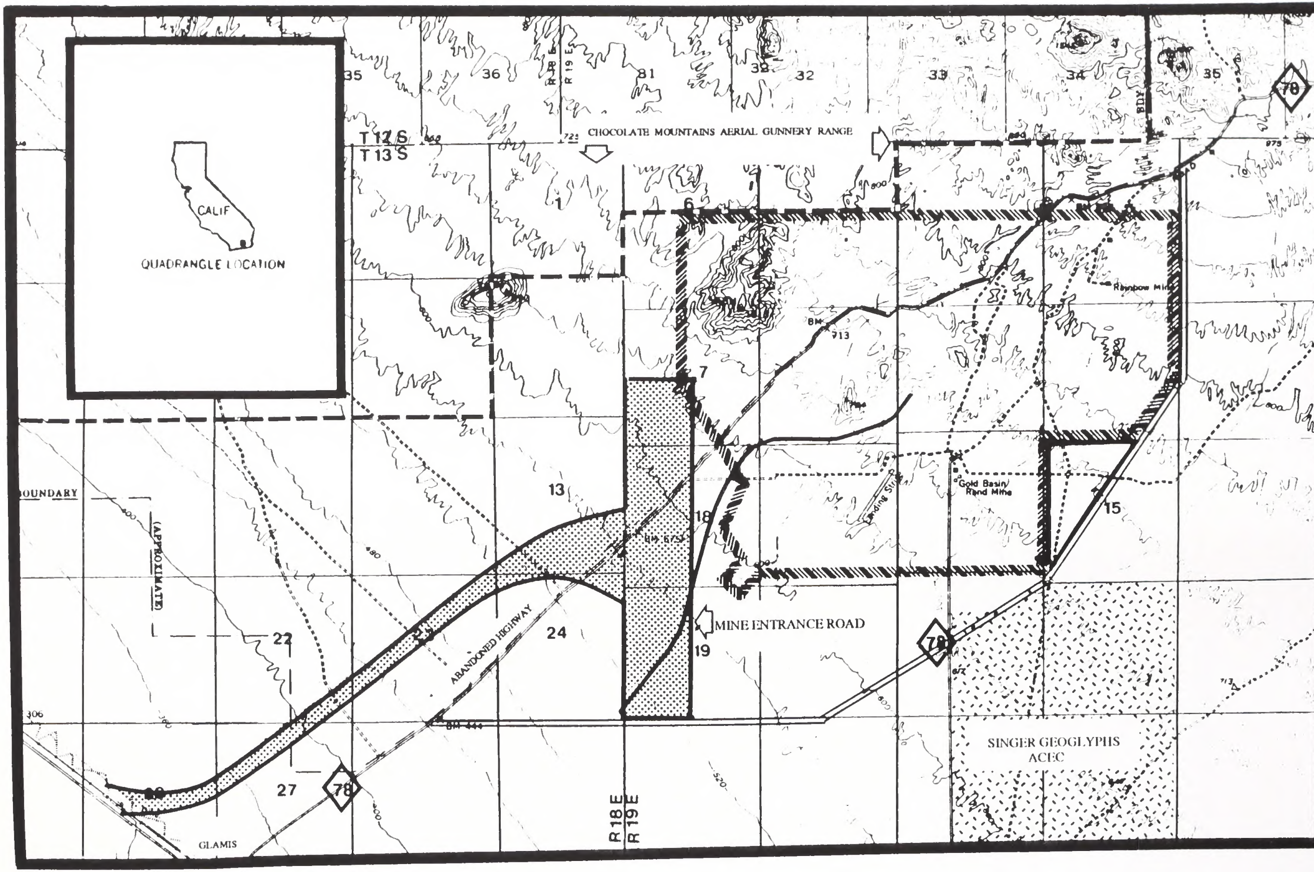

FIGURE 1. Location of proposed Mesquite Regional Landfill site.

- Mesquite Regional Landfill Study Area
- Mine Boundary

gold mining operations are conducted to the west and north. State Highway 78, a 2-lane highway, runs along the southern edge of the mine boundary at this point.

Section 18 - The western half of section 18 is similar to Section 7, with a few exceptions. The northern portion is more open than Section 7 and both the washes and trees are fewer and smaller. The southern portion of Section 18 is fairly homogeneous, with confluent, shallow drainages less than a foot deep. Ironwood is the aspect dominant species, with common palo verde, creosote bush, burro bush, and brittlebush. Most of the center of this half-section has been heavily graded over a period of many years, as evidenced by general grading, borrow pits, piles of gravel, and a sparse regrowth of vegetation (cheesebush and brittlebush). Old Highway 78, from which the pavement has been lifted, crosses Section 18.

Section 19 - The western third of Section 19 is similar to the southern edge of Section 18, although there are fewer trees in the former. Grading is limited to the area adjacent to the Gold Fields entrance road and Highway 78 and to a current gravel operation west of the section.

Rail Spur and Adjacent Habitat - The northeastern extension of the planned route hosts areas of fairly homogeneous floodplain, where trees and shrubs (species as above) are scattered throughout (approximately 10% cover); substrates are gravel over soft, gravelly sandy loam. This habitat alternates with open areas of broad expanses of well- to poorly-defined, basaltic, gravel pavement bordered by well-defined arboreal washes and scattered small channels. In the southern portion of the planned rail route, the soil becomes sandier and the washes are less well-defined. Creosote bush and burro bush are aspect dominants, with common brittlebush and ratany (*Krameria parvifolia*); big galleta (*Hilaria rigida*) and palo verde are common in washes. Heavy grading associated with gravel operations, both past and ongoing, occurs in patches throughout the route. Additional disturbances include the intensive off-highway-vehicle (OHV) play area along the railroad at Glamis (Glamis-Gecko OHV Open Area), approximately one-half mile southeast of the proposed rail route.

General - The elevation in the area is quite low (about 500 feet) to host a robust tortoise population. While tortoises occur from approximately 4000 feet to sea level (Karl 1983 and field notes), low elevations apparently host fewer tortoises, possibly because of higher mean temperatures and shortenened activity season (pers. obs.). Adjacent land uses are thoroughly reviewed in ESI (1991). In summary, they include the Chocolate Mountains Gunnery Range, gravel operations, and OHV use. The Chocolate Mountains Gunnery Range, occupying a broad expanse of the Colorado desert and hosting live-shelling activities, lies only one mile west and less than one mile north of the planned facility (see ESI 1992). Moderate to intensive gravel mining occurs east of Highway 78, north of Glamis. Intensive OHV use occurs primarily in the vicinity and south of Glamis. The area around the planned facility, west of Highway 78, is designated a "Limited" use area. East of the highway the area is designated "Moderate" use, with the exception of the Singer Geoglyphs Area of Critical Environmental Concern (ACEC). This ACEC comprises an area of approximately five square miles entirely withdrawn from vehicular travel.

2.3 Land Ownership

Section 7 is fee land controlled by GFOC. Sections 15, 18, 19 and the rail spur are all Bureau of Land Management (BLM)-managed lands, currently withdrawn for gravel operations. Lands immediately east of the planned facility are controlled by GFOC; north and south of the rail spur are public domain lands managed by the BLM.

3.0 SURVEY METHODS

Prior to conducting the surveys, the U. S . Fish and Wildlife Service was contacted (Art Davenport, Carlsbad Office, 6 January 1992, pers. comm.) to verify planned survey methods. These survey methods needed to be sufficient to verify presence of desert tortoises on the project site and provide adequate information for determination of incidental take. Presence of desert tortoises on the project site would result in the lead federal agency's (the BLM in this case) determining that the project might affect desert tortoises. This "may affect" determination would then engender a formal Section 7 consultation with FWS. This agency would subsequently issue a Biological Opinion as to whether the project would jeopardize the species. If a non-jeopardy Biological Opinion were issued, FWS would also issue an allowable "incidental take" for tortoises directly impacted by the proposed project.

Since we already knew that tortoises inhabited the area, the standard FWS protocol of 100% coverage for the basic presence-absence survey was unnecessary. We agreed that an estimated take number could be developed if surveys concentrated on the most likely habitat, but covered at least 50% of the site. Given the generally poor habitat quality and a solid reference point for both habitat quality and tortoise density from clearance surveys on Section 16, this truncated survey was sufficient to estimate take levels. (Only an intensive mark-recapture survey, with a minimum of three 100% surveys of the site, would substantially increase the accuracy of the take estimate.) Only those areas outside of the mine boundary (hereafter referred to as the expanded area) which had not previously been surveyed, plus the planned rail spur, would be surveyed. (FWS agreed that additional surveys within the mine boundary, where several surveys had been previously conducted, would not be necessary since tortoises were clearly present, in low numbers.) In fact, our surveys covered approximately 65% of the site. The 500-foot-wide rail spur right-of-way (ROW) would receive 100% coverage because of its linear shape and distance from the well-surveyed mine site. "Zone-of-influence" transects (FWS 1990), to estimate the effects of the facility on tortoises with home ranges that might intersect the site, would be conducted for the rail spur and open areas adjacent to the planned facility. We agreed that the timing of the surveys should coincide with maximum sign accumulation, in late Spring.

Surveys were conducted between 21 and 26 May 1992. The weather was clear and there had been no rain for over two months. Six people conducted the surveys, three with extensive experience searching for and identifying sign, two with moderate experience, and one with no tortoise experience. (The latter person was always teamed with one of the most experienced observers and never worked alone.) From two to five people walked a swath of parallel transects spaced 20 yards apart (10 yards apart in the rail spur ROW; *cf* Figure 2), although more concentrated searches (i.e., transects more closely spaced) were made of drainages than open areas. Transects were 1 mile long in sections 18 and 19, one-half mile long in Section 7, varied relative to the area left to survey in Section 15 (from 1 mile to 0.25 miles long), and approximately 4 miles long in the rail spur alignment. A total of 42 to 50 transect swaths were walked in Sections 15, 18, 19 and 7; 16 were walked in the rail spur ROW. (Except for the rail spur alignment, it is meaningless to report the number of single [i.e., one-person] transects completed because of the odd shapes of the areas surveyed. For instance, in Section 15, we walked 62 individual transects. At first glance this seems like a higher percentage of coverage than the 50% agreed upon by FWS because we only walked 1/3 of the section, and FWS protocol suggests 61 transects for 100% coverage in 1/3 of a section. However, the shape of the section we covered was approximately 2/3 of a mile wide, which would necessitate 122 transects for 100% coverage, so our actual coverage with 62 transects was 50%. Zone-of-influence transects were 10 yards wide and walked at 110, 220, 440, 880 yards south of and parallel to the southern rail spur ROW edge; an identical set of zone-of-influence transects was also walked north of the northern border of the ROW, with an additional transect at 1300 yards. (This transect was deleted in the southern set because of the influence of Highway 78.) Because of the location of rail spur transects and associated zone-of-influence transects, no additional zone-of-influence transects were needed for sections 7, 18, and 19. Since Section 15 is affected by mining operations to the immediate north and west and has effectively been segregated from the surrounding population by the mine fence, zone-of-influence transects were not needed. All tortoise sign (e.g., burrows, scat, tortoises, carcasses, tracks, drinking sites, and eggshell fragments) observed was recorded, mapped, and described as to size and condition. Additionally, canid scat, raptor pellets, and woodrat nests were carefully examined for tortoise parts to establish tortoise presence. Habitat was also mapped with regard to vegetation, soils, and topography and locations of individual disturbances. The aspect-dominant perennial and annual vegetation were recorded, as well as the less common species; density was estimated occularly. Topography was described, as well as relief height and slopes and the nature of the drainages. Substrates and soils were cursorily examined to provide an estimation of coarse particulate content, consistence, and texture.

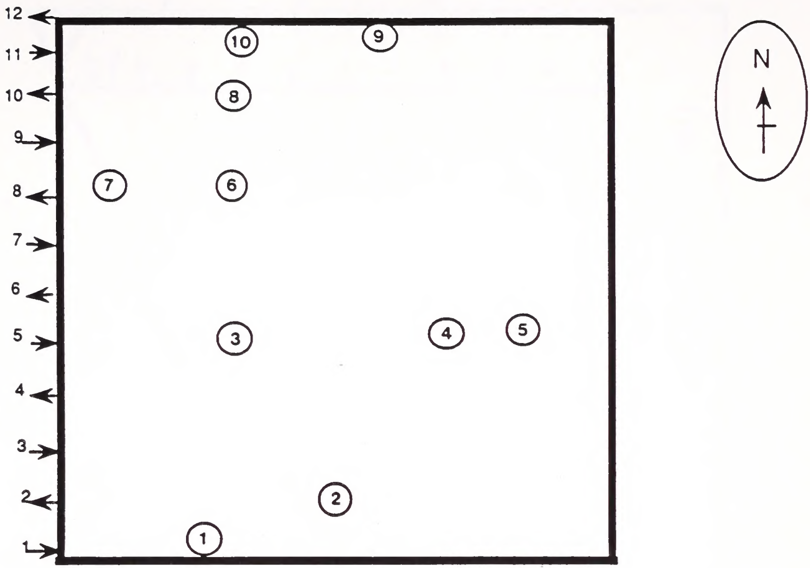

FIGURE 2. Schematic location of transect swaths and tortoise sign on Section 7, Proposed Mesquite Regional Landfill Site

 - Transect Swath (number, direction of travel, location)

 - Tortoise Sign (Reference: Table 1)

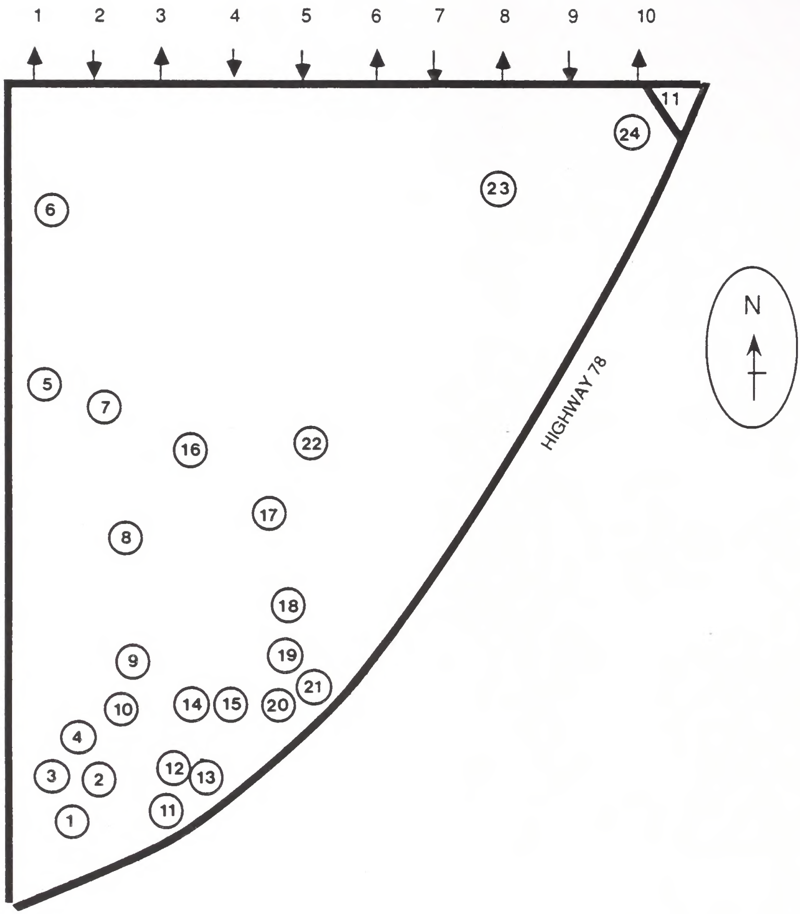

FIGURE 3. Schematic location of transect swaths and tortoise sign on Section 15, Proposed Mesquite Regional Landfill Site.

↑ - Transect Swath (number, direction of travel, location)

(1) - Tortoise Sign (Reference: Table 1)

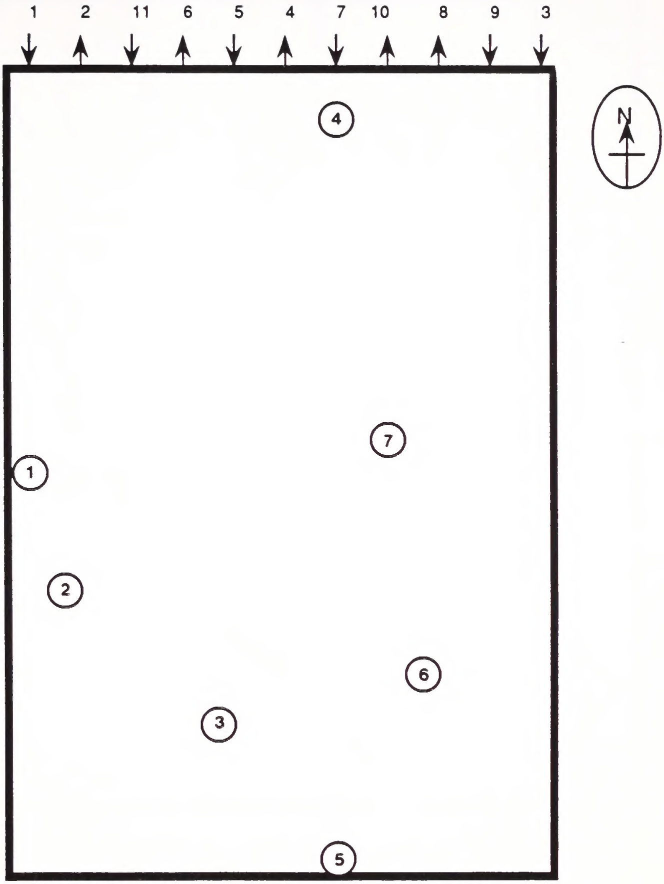

FIGURE 4. Schematic location of transect swaths and tortoise sign on Section 18, Proposed Mesquite Regional Landfill Site.

- Transect Swath (number, direction of travel, location)

- Tortoise Sign (Reference: Table 1)

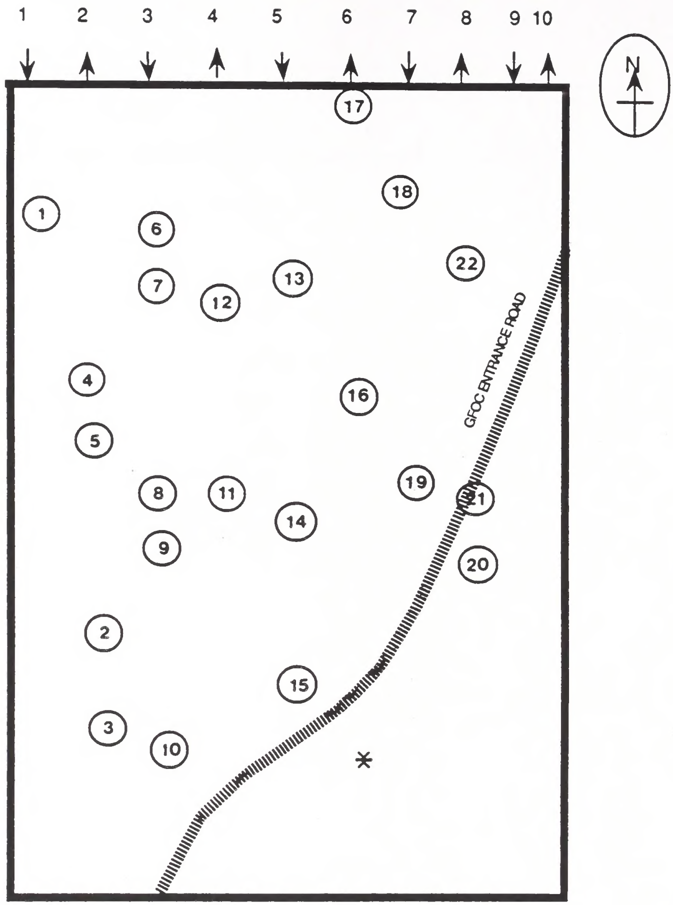

FIGURE 5. Schematic location of transect swaths and tortoise sign on Section 19, Proposed Mesquite Regional Landfill Site.

↑ - Transect (number, direction of travel, location)

(1) - Tortoise Sign (Reference: Table 1)

✱ - Old Kit Fox Natal Den

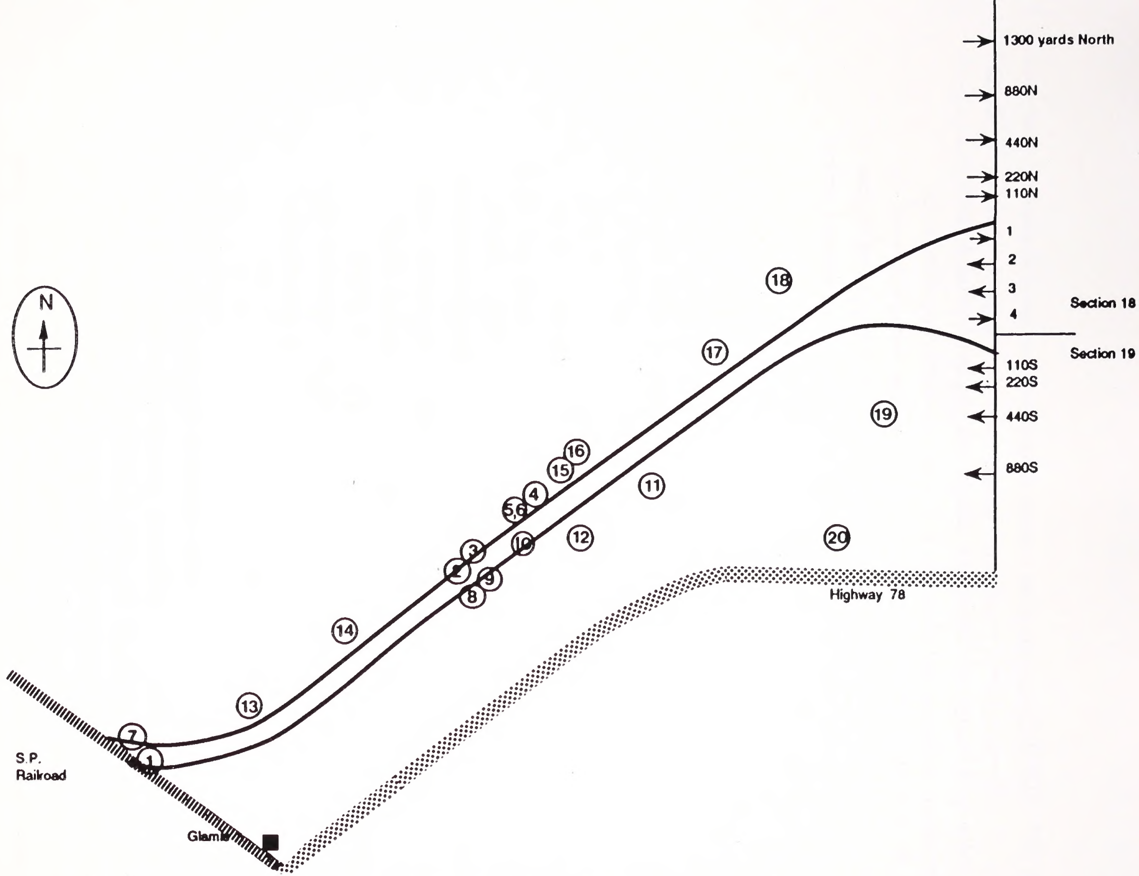

FIGURE 6. Schematic location of transect swaths and tortoise sign on the rail spur alignment, Proposed Mesquite Regional Landfill Site.

↑ - Transect (number, direction of travel, location

(1) - Tortoise Sign (Reference: Table 1)

4.0 SURVEY RESULTS

A total of 83 definite and questionable tortoise sign was found during the surveys, 63 on the planned facility site and 20 on the rail spur and associated zone-of-influence transects (Table 1, Figures 2-6). To estimate tortoise abundance, a comparison was conducted between the number of observed burrows (the most reliable sign type because of relatively high visibility and longevity), by section, and that found during clearance surveys on Section 16 this spring (Karl 1992a) (Table 2).

Sign levels on Sections 7 and 19 were roughly similar to those found on Section 16, while Section 18 and the rail spur had lower sign levels (Tables 2 and 3). (Because of the lower experience level at absolutely identifying tortoise burrows of the observers on Section 16, it is expected that the two categories for questionable tortoise burrows, classes 4 and 6, would be higher on Section 16.) These results are consistent with the habitat quality on the respective sections. All of the expanded area has inherently similar habitat to that on Section 16, representing only fair desert tortoise habitat (i.e., tortoises present, in low numbers) because of the open nature, lack of forage, and short growing season. However, Section 18 has experienced extensive habitat degradation as a result of gravel operations. The rail spur alignment is generally of slightly lower habitat quality than the expanded area and also experiences extensive habitat degradation from recreational activities and gravel operations. These results indicate that tortoises are present in low numbers, probably approximately 15 tortoises >140mm in length, on sections 7 and 19. For the benefit of this federally-listed species, this estimate would be appropriate for Section 18 and the rail spur also.

Section 15 has the best inherent tortoise habitat yet surveyed on (Karl 1992a) or adjacent to the Mesquite Mine. It has both denser vegetation and greater relief than all other sections surveyed within and outside of the mine fence (with the exception of Section 7, which is similar) and appears to have a more diverse understory than the remainder of the GFOC proposed landfill expansion area. Interestingly, if one compares the number of definite tortoise burrows found during clearance surveys on Section 16 with those found on Section 15 (adjusted for unequal survey coverage), there were nearly twice as many burrows on Section 16 (Table 2). This may be a function of sampling artifact, since one might expect more burrows to be found on Section 16 because of the comparatively intensive nature of that survey (i.e., clearance prior to grading). However, the increased

Table 1. Results of Surveys for Tortoise Sign on the Proposed Mesquite Regional Landfill (Section 15 and Expanded Area).

Section	Transect Swath	Sign No.	Sign Type	Class (a)	Width (mm)	Comments
7	1	1	Pallet	3	275	
	2	2	Burrow	6	250	Off-transect
	5	3	Burrow	2	300	Tracks, eggshell fragments
		4	Burrow	5	Adult	
		5	Burrow	5	360	
	8	6	Burrow	6	300	
		7	Scat	3	14	
	10	8	Burrow	4	270	
	11	9	Burrow	3	220	
		10	Pallet	3	400	
15	1	1	Pallet	2	305	
		2	Pallet	1	300	
		3	Scat	2	13	
		4	Scat	3	18	
		5	Burrow	2	240	Class 2 Scat, 19mm wide
		6	Burrow	4	320	
	2	7	Scat	3	14	
		8	Burrow	1	300	
		9	Tracks	Fresh	Adult	40m from Sign No. 10
		10	Scat	2	18	
		11	Shell	>3 years old	Adult	
		12	Scat	1	20, 21	
		13	Scat	1	22	
		14	Scat	3	14	
		15	Scat	1	23	
		16	Burrow	4	370	
	3	17	Burrow	2	240	
		18	Scat	1	21, 22	
		19	Scat	2	21	
		20	Burrow	1	100	Juvenile Tortoise
		21	Scat	2	14	
	5	22	Scat	2	23	
	8	23	Burrow	4	165	
	9	24	Burrow	6	250	
18	1	1	Burrow	1	360	Tortoise
	2	2	Burrow	4	230	
	5	3	Burrow	1	292	
	7	4	Burrow	6	280	
		5	Burrow	4	125	
	8	6	Burrow	5	350	
	10	7	Scat	2	20	
19	1	1	Pallet	4	250	
	2	2	Burrow	6	175	
		3	Burrow	3	250	
		4	Burrow	5	270	
		5	Scat	2	17, 19	
	3	6	Pallet	1	170	
		7	Burrow	1	220	
		8	Burrow	1	250	
		9	Burrow	6	150	
		10	Scat	2	10	
	4	11	Scat	2	15	
		12	Pallet	5	250	
	5	13	Burrow	1	270	
		14	Scat	2	24	

Table 1, continued

Section	Transect Swath	Sign No.	Sign Type	Class (a)	Width (mm)	Comments
19, cont.	5, cont.	15	Burrow	4	150	
	6	16	Burrow	3	250	
		17	Burrow	5	230	
	7	18	Burrow	4	220	
		19	Burrow	3	205	
	8	20	Burrow	4	181	
		21	Burrow	1	240	Tortoise
		22	Burrow	6	260	
Rail Spur	1	1	Burrow	3	205	
		2	Burrow	3	260	
		3	Burrow	2	300	
	2	4	Tortoise	---	205	Female
		5	Burrow	5	240	Same mound as Sign No.6
		6	Burrow	3	280	
		7	Burrow	3	144	
	3	8	Scat	2	18	
		9	Burrow	3	145	
	4	10	Burrow	5	320	
	Z-of-I -220 south	11	Scat	2	18	
		12	Scat	1	16	
	Z-of-I - 110 north	13	Burrow	2	230	
		14	Burrow	3	240	
		15	Scat	2	141618	
		16	Burrow	2	230	Several class 3 scat
		17	Pallet	3	170	
	Z-of-I - 220 north	18	Burrow	5	140	
	Z-of-I - 440 south	19	Scat	2	14	
	Z-of-I - 880 south	20	Burrow	5	200	

(a) Sign Classes Reflect Age of Sign as Follows:

Burrows: Class 1 - Definitely tortoise, fresh
2 - Definitely tortoise, used this activity season
3 - Definitely tortoise, not used this season
4 - Questionably tortoise, in good condition
5 - Definitely tortoise, deteriorated
6 - Questionably tortoise, deteriorated

Scat: Class 1 - Fresh
2 - Dark, this season
3 - Somewhat to very bleached

Table 2. Comparison of burrow counts on Section 16 clearance and proposed Mesquite Regional Landfill Site (expanded area), adjusted for comparability at 100% cover (see footnotes for calculations). (Only burrows wider than 140 mm were used because of consistency of visibility [see Karl 1989 for review].)

Section	Burrow Class 1	2	3	4	5	6
16[1]	18	10	22	22	14	42
15[2]	18	18	0	18	0	6
7[3]	0	8	32	8	32	3
18[4]	8	4	0	8	4	4
19[4]	20	16	12	16	12	12
Rail Spur[5]	0	2.5	12.5	0	5	0

1 - Total number of sign observed was multiplied by 2 for comparability to 100% cover over 1 square mile.
2 - Total number of sign observed was doubled for comparability to 100% cover, then multiplied by 3 because only 1/3 section was surveyed.
3 - Total number of sign was doubled for comparability to 100% cover, then multiplied by 4 because only 1/4 section was surveyed.
4 - Total number of sign was doubled for comparability to 100 % cover, then multiplied by 2 because only 1/2 section was surveyed.
5 - Number of sign is estimated per square mile using the following computation:
    A) A 500-foot-wide ROW is roughly 10% of the width of a square mile
    B) Multiply by 10 to get 100% coverage of 4 square miles.
    C) Divide by 4 for number of sign per 1 square mile.

number of incised washes on Section 15 might be responsible for the lack of older burrows. This is because tortoises in this habitat tend to construct most of their burrows in washes and annual rains (mostly in winter and early spring) would probably result in the eradication of most of the previous-year burrows due to washing. If only current-year burrows are used for the comparison, the counts are more similar between the two sections. The survey results may indicate that there are either more tortoises on Section 16 (Columns 1 and 3 of Table 3) or approximately the same number of tortoises on Sections 15 and 16 (Column 2 of Table 3). Because of the habitat quality, it is also possible that originally there were more tortoises on Section 15, prior to the impacts from

Table 3. Comparison of definite tortoise burrow (exceeding 140mm in width) counts on Section 16 Clearance Survey with proposed Mesquite Regional Landfill Site (expanded area), adjusted for equality of cover (see Table 2).

	Definite Tortoise Burrows		
Section	Class 1,2,3,5[1]	Class 1 and 2[2]	Class 1,2, and 3[3]
16	64	28	50
15	36	36	36
7	72	8	40
18	16	12	12
19	60	36	48
Rail Spur	20	2.5	15

1 - Total number of definite tortoise burrows.
2 - Burrows of the current year only.
3 - Burrows of the current year plus good-quality burrows of previous activity seasons (allows for mistaken identification of Class 2 burrows as Class 3).

Highway 78, than are currently there. In any case, the current densities of tortoises are low, approximately 15 to 20 tortoises ≥140mm in carapace length per square mile, based on clearance surveys on Section 16 and habitat similarity between the sections.

While estimates of take for individual tortoises and habitat are mandated by the Endangered Species Act, the most important consideration is the potential effects on a population or species from such a loss (of either individuals or habitat). The nearest core tortoise population is the Chuckwalla Bench population, approximately 30 miles northwest, over the Chocolate Mountains. The proposed landfill essentially lies at the periphery of this population. Importantly, no critical corridors connecting core populations or important habitats are represented by this site, although the combination of the mine, the landfill, and the four-mile-long railroad with the natural topographic features of the valley (mountains in the north, sand dunes south of the railroad) would leave only a small corridor of poor, continuous habitat (north of the mine) connecting tortoises east and west of the facility. Population fragmentation has long been recognized as an important factor in local extirpation because of genetic factors and the increased effects of impacts (e.g., disease, natural disaster, habitat loss) on a smaller number of animals. The importance of fragmentation on this peripheral portion of the main population, with its low numbers of animals, is obviously not as great as if it occurred in the core, but it is of concern.

Bureau of Land Management (BLM) tortoise category maps define this site as uncategorized, which is equivalent to the low-priority Category 3 (U.S. Department of the Interior [USDI] 1989). BLM habitat categories, ranging in decreasing importance from Category 1 to Category 3, were designed as management tools to insure future protection and management of these areas and their associated desert tortoise populations (USDI 1988a). (Note: These category maps roughly coincide with the FWS class maps for tortoises, which are based on density and habitat. However, FWS is no longer using their class maps.) Thus, these categorizations are based not solely on tortoise density and the quality of the habitat, but also on other land-use conflicts and estimated local tortoise population trends. Category 1 habitat areas are considered essential to maintenance of large, viable populations, have primarily medium to high density populations, and have resolvable conflicts. Category 3 habitat areas are not considered essential to maintenance of viable populations, are thought to have low to medium density populations isolated from higher density populations, and have unresolvable conflicts.

5.0 POTENTIAL IMPACTS

Typical impacts from construction and operation of a landfill facility must be examined in order to develop measures to mitigate their effects on the relevant population of a listed species and on the species as a whole. While such typical impacts are discussed below, some mitigation measures have already been developed and are in use at the Mesquite Mine. Thus, impacts are also discussed in light of what may be expected following implementation of said measures.

5.1 Construction Phase

Impacts from construction of the landfill are largely limited to direct effects on tortoises on the site and in the immediate area:

1. Tortoises may be lost, either by being inadvertently crushed (as, for example, in unfenced equipment areas and on access roads used by construction workers) or by being removed from the population altogether. At this time, the FWS does not necessarily condone translocation of tortoises from a site this large; tortoises may have be removed from the population for use in research, for example. At the Mesquite Regional Landfill, the site would be fenced and tortoises would be removed by intensive clearance efforts prior to further construction. (This follows recent mitigtion protocol on the Mesquite Mine site.) This would eliminate the crushing of tortoises within the fenced site.

2. After removal of tortoises from the site, loss of the site's habitat will affect tortoises outside the fence with home ranges that intersect the site. These tortoises will experience a loss of forage (depending upon the season of construction), coversites, and other unidentified resources and will experience disrupted movement patterns.

3. Should tortoises be translocated from the facility, they would also be affected by the potential stresses of translocation (mostly, but not limited to, lack of knowledge of coversites, nest sites, foraging areas). Furthermore, recipient animals to the translocated tortoises would potentially be affected by reduced forage and increased agonistic social interactions.

4. The effects of any disease could be exacerbated. Not only could diseased animals be further stressed from disturbance, habitat loss, and relocation, but disease transmission could also escalate during relocation efforts. While there is no evidence on the site of the respiratory disease (URTDS) that has decimated northwestern Mojave Desert populations of tortoises, Chuckwalla Bench, approximately 30 miles northwest, has been experiencing statistically significant tortoise losses since at least 1988 (Luke *et al* 1991) from an unknown pathogen.

5. Impacts would also include temporary disruption of the vertebrate community structure, including predator/prey relationships, adjacent to the site. For example, losses of rodents during construction activites could result in prey-switching to small tortoises by local canids. However, such changes would be temporary, lasting only until predators adjusted their ranges and the remaining prey populations adjusted. These effects are also likely to be minor.

5.2 Operations Phase

Once the facility is fenced, project operations would presumably affect only tortoises in areas surrounding the facility (since tortoises will have been removed from the site), as a result of habitat loss. (It is notable that the Endangered Species Act also addresses loss of habitat in its definition of "take.") Such typical impacts, listed below, could be partially or fully mitigated by appropriate solutions.

1. The long-term loss of habitat includes loss of food, special resources, special burrows, and nesting sites.

2. Natural movements will be temporarily disrupted, although ultimately tortoises will permanently adjust their original ranges.

3. The combination of the mine, the landfill, the four- to five-mile-long rail spur, and the natural topographic features of the valley would leave only a small corridor of continuous (albeit poor) east-west habitat, north of the mine. This would result in nearly complete fragmentation of the area's tortoise population

into one subpopulation east of the landfill and one to the west. However, should the rail spur effects be successfully mitigated (see Section 6.1.1 below), this fragmentation should not occur.

4. In addition to presenting a substantial impediment to travel, with resultant disrupted gene flow and population segregation, the rail spur will potentially impact tortoises in two other ways: (a) as a source of mortality for tortoises caught between the rails; and (b) by inflicting potential auditory damage from train noise levels. In a high desert tortoise density area in Fenner Valley, California, dead tortoises are commonly observed between the rails of a busy, four-track system (M. Jewell, Track Supervisor for Santa Fe Railway, pers. comm.). In this same area, Karl (1989b) found that tortoise sign was significantly less within 0.5 miles of the tracks than further from the tracks (although the interpretation of these results is somewhat obscured by the association of the tracks with a road). Such tortoise deaths probably occur largely from thermal exposure when a tortoise is trapped between the rails, rather than by contact with train wheels, because a tortoise would actually have to be on a rail to contact the train (M. Jewell, pers. comm.). However, having crossed over a rail, a tortoise would be more likely to follow the rail rather than expend the considerable effort to negotiate a second rail. Furthermore, as ambient temperatures increased, high rail temperatures would deter a tortoise from attempting to cross. If ambient temperatures were sufficient, a tortoise caught between the rails would die of thermal exposure as a result of lack of cover and the impossibility of burrowing. Such deaths would primarily affect larger, breeding-age tortoises, i.e., those of sufficient size to negotiate the seven-inch rail proposed for the rail spur.

   Tortoise-to-track exposures may increase as a result of the attraction of the railroad berm to tortoises. In general, tortoises are favorably attracted to topographic relief for burrowing sites (Karl 1983, 1988, field notes). In contrast to the aforementioned study on railroads and associated tortoise densities (Karl 1989b), RECON (1992) found that more tortoise burrows were associated with a railroad berm of an active rail line than 0.25 miles away. While no replicate transects or transects further than 0.25 miles away from the tracks were conducted, this study, along with two others on active rail lines where RECON (1992) examined the berm and adjacent habitat up to

50 feet from the berm, verifies that tortoises use railroad berms for burrowing. Whether they occupy adjacent habitat in higher numbers has not been adequately tested, however. Therefore, it is unknown whether tortoises would actually be attracted to a railroad berm. Even if they were, appropriate mitigation, such as tortoise ramps suggested by Arid Operations, would be adequate to eliminate most track-related mortalities.

Noise levels associated with trains could result in permanent or temporary deafening of tortoises occupying the underlying berm. The estimated noise level from a train at a distance of 3 feet is 115 to 120 dBA (Environmental Science Associates, pers comm, in Karl 1989b). RECON (1991 in RECON 1992) measured train noise levels at 50 feet from the tracks and recorded maxima of 95 dBA for the first train and 73.7 dBA for a second. While no studies have been conducted on hearing damage in chelonians, studies on desert lizards show that extended exposure (1 to 10 hours) to low frequencies at 115 dBA resulted in hearing loss in desert iguanas (*Dipsosaurus dorsalis*) (Bondello 1976); a 500-second exposure at 115 dBA resulted in a decreased hearing response in Mojave fringe-toed lizards (*Uma scoparia*) (Brattstrom and Bondello 1983). While the effects of train noise on desert tortoises is unknown, it could be speculated that hearing damage would not result in life-threatening behavior, as it might in lizards that could not detect their predators. However, responses to conspecifics might be altered, with subsequent disruption of courting, mating, and agonistic behavior.

5. Tortoises may be killed on access roads to the site, where these roads intersect native, unfenced habitat.

6. Ravens and other carnivores may be attracted to the site in response to lights, increased perch sites, road kills, standing water, and windblown refuse, resulting in alterations of the predator-prey relationships in the local vertebrate community and subsequent loss of tortoises.

7. The quality of the adjacent habitat may be diminished by ongoing noise and and activity associated with the facility and by the presence of an altered landscape (e.g. buildings, piles, "missing" washes and trees). Our knowledge of tortoises does not extend fully to the effects of such impacts,

although the presence of tortoises around urban areas suggests that at least some tortoises adjust to visual, tactile (i.e. vibrations), and auditory changes in their environments. However, the full extent of these impacts is unknown.

8. Soil disturbance and resulting dust could degrade both the forage base and coversite potential for tortoises immediately adjacent to the site as a result of wind erosion and deposition. This is likely to be negligible, however, because dust control measures, such as those already implemented at the Mesquite Mine, would be used at the landfill. Monitoring at the mine has determined that dust there is within acceptable limits for health standards.

9. It is unlikely that recreational activities will increase in the area of the landfill, especially in light of the attractiveness of the Glamis-Gecko OHV play area, unless the BLM alters the use designation for the area from Limited to Moderate and establishes new OHV play areas.

6.0 RECOMMENDATIONS

6.1 On-Site Mitigation.

6.1.1. Construction Phase.

Arid Operations is well aware of the mitigation measures associated with tortoises in this region, having implemented several at the Mesquite Mine, adjacent to and including part of the landfill. Recommendations for mitigation and compensation include the following:

1) The site proper will be fenced to exclude tortoises prior to construction. Because of the difficulties with periodic washouts under the fence in natural drainage areas and elsewhere, the fencing may have to be buried or otherwise installed in such a manner as approved by FWS. Requirements by FWS may also include using one-inch-mesh hardware cloth along the lower edge of chain link to ensure exclusion of even the smallest tortoises. Fencing installation should discourage perching by predatory birds, although roosting on the fence would probably be minor compared to that in the local trees.

   Any new roads built to accomodate the site may require temporary fencing until construction is complete. This will prevent roadkills of both tortoises and other wildlife, the carrion of which could attract scavengers that also prey on tortoises. Such fencing, however, may not be required if construction can be completed during winter, when tortoises are inactive. Temporary fencing has its own inherent problems, however, in that it can be difficult to build effectively and it blocks natural movements of animals. Thus, any roads over approximately 0.5 miles long should probably not be fenced. Instead, for the purposes of construction only, road-building crews should be continually accompanied by biological monitors (see No. 2, below). Following construction of the road, but during the remainder of landfill construction, other mitigation measures, such as lowered vehicle speeds, would be implemented (see No. 7, below).

   Construction in the rail spur should follow that recommended for roads; i.e., if construction occurs outside of the winter tortoise inactivity window, it should proceed in fenced, 0.5-mile increments or should be accompanied by full-time biological monitors.

2) All initial land clearance will be conducted in the presence of a qualified biologist or person trained by a qualified biologist for the purpose of removing tortoises, such as has occurred at the mine. Depending on the number of animals necessitating removal, translocation to another site may or may not be approved by FWS. (At this point in time, the California Department of Fish and Game does not approve of translocation.) Translocation from the rail spur alignment will probably be acceptable because tortoises could be placed into another part of their existing home range. Translocation of animals would proceed using state-of-the-art techniques and protocol agreed upon by FWS. (See ESI 1991 for accepted techniques for translocation.) Other FWS-approved alternatives for disposal of tortoises could include adoption or use in research.

3) In any unfenced construction areas, any tortoises sighted by workers will be removed to safety, either by a qualified biologist or person(s) trained by said biologist. Gold Fields Mining Company has stressed such a program for the Mesquite Mine, including the training of a small core group of individuals, one or two of which are present at the site at all times, to remove tortoises appropriately.

4) Workers will be educated as to the natural history, endangerment factors for tortoises, and appropriate protocol for dealing with tortoises encountered in and around the site. Such an education program already exists at the mine and will be reviewed by tortoise biologists and agency biologists for use at the landfill.

5) Technical requirements demand that the railroad be constructed with 7-inch rail. A suggestion has been made to deposit and maintain broad gravel or wooden "beaches" at appropriate intervals (e.g., 75 feet) to provide tortoises entering the tracks with passage over the second set of rails. Gravel or wooden ramps could also be placed outside the rails to prevent tortoises that crawl over the rails from flipping upside-down. Such a mitigation measure would allow tortoises, especially the very important large breeders, to cross from one side of the tracks to the other, thereby maintaining a genetic connection within the population. Simultaneously, tortoises would not be trapped between the rails to die of

exposure. (See Section 6.1.3 - 3, for railroad mitigation following construction.)

In an effort to reduce noise impacts to desert tortoises and other wildlife in the surrounding habitat, noise berms could be built parallel to and 100 feet away from the railroad. This would also be potentially more attractive to tortoises for burrowing than the railroad berm itself because of the relatively low levels of vibration and noise.

6) No ponding water or uncovered trash should collect on the site during construction. This is an effort to avoid attracting predators to an unnatural food or water source. (Note: The facility fences will have limited value excluding terrestrial predators and none with regard to avian species.)

7) Where unfenced, landfill-associated roads intersect tortoise habitat (see No. 1, above), vehicle speeds may have to be lowered during wildlife activity periods (spring, fall, early morning and late evening in the summer) to avoid roadkills. This is standard BLM and FWS policy, and is independent of road length. The only road for which this should be open to discussion is the currently-used mine access road. Vehicle speeds on this paved road are currently unregulated, so mine policy would also have to be altered if vehicle speeds were lowered for the purposes of landfill construction. Because this road is paved and tortoises (especially the larger ones) are relatively easily seen, an enforced speed of 35mph, for both mine- and landfill-associated workers, would be appropriate.

6.1.2 Operations Phase.

In addition to ongoing programs established during the construction phase, such as worker education and the removal or avoidance of tortoises in potential danger, the following recommendations are suggested:

1) During the life of the facility, tortoises found on-site will be removed from danger and located elsewhere. (This event is unlikely because tortoises will have already been cleared from the site. Even in the best of clearances, however, an occasional tortoise, especially a juvenile, may be missed. Also,

tortoises could re-enter at undetected breaks under the fence.) The handling protocol and deposition sites for these tortoises will be agreed upon in consultation with tortoise biologists and agency biologists prior to landfill construction.

2) FWS and BLM may require that the access road be fenced, with appropriately-spaced culverts to guarantee that tortoise movements are not blocked and that tortoises are not inadvertently funneled to Highway 78. In order to accomplish this successfully, the road bed would have to be raised so that culverts would be level with the existing terrain. Because of the costs associated with this type of road construction and fencing, I would instead suggest that vehicle speeds be lowered to 20 mph for all employees and refuse trucks, enforced by speed bumps. Should the existing mine access road be used for partial access, vehicle speeds could be lowered to 35mph on that road, for all vehicles (see 6.1.1 - 7, above).

3) In order to evaluate the effects of tortoise ramps associated with the railroad, studies should be conducted over the first five years of the project to monitor tortoise casualties, especially as associated with increased use of the railroad berm by tortoises over surrounding habitat. Should mortalities be judged to be excessive, other mitigation strategies could be implemented. These could include restricting train travel to those portions of the day during which tortoises are inactive (e.g., all day from 30 November to 1 March, before 0800 h and after 1800 h from 1 March to 15 April and from 1 October to 1 December, and between 0900 h and 1700 h between 15 April and 1 October). Alternatively, the railroad could be fenced with tortoise-proof fencing and adequately spaced culverts for tortoise passage.

4) In an effort to avoid attraction of tortoise predators, no ponding water will remain uncovered on-site. Refuse will be continually covered and appropriate measures will be implemented to eliminate trash scattered by wind and landfill operations (e.g., wind fences and routine trash clean-up in addition to continual covering of open refuse piles).

6.2 Off-Site Compensation.

Off-site compensation should be implemented to replace lost habitat. BLM allows for the loss of Category 3 habitats "only if accompanied by an adequate compensation package involving acquisition of Category 1 habitat" (BLM Recommendation No. 30, USDI 1988b). The BLM has developed habitat compensation formulas (USDI 1988b) that reflect potential loss of this area for use by tortoises, projected degradation of surrounding habitat due to the large size and nature of this project, and the potential for future development resulting from this project. BLM's current suggested compensation ratio for all Category 3 habitat (although it has not yet been completely approved by this agency [L. Foreman, Riverside BLM office, pers. comm.]) is 1:1.

Potential purchase sites for compensation have already been approved by BLM and FWS for the Mesquite Mine (ESI 1991) and land in the same area would probably also be acceptable compensation for the landfill. These sites are in the Chuckwalla Bench ACEC, the tortoise population of which is connected to the one at the landfill. This complies with the BLM management goal to consolidate Cateory 1 habitats and use compensation funds to acquire the closest Category 1 habitat (BLM recommendation No. 31, USDI 1988b). Chuckwalla Bench is also one of the two highest priority acquisition areas targeted by BLM (USDI 1988b).

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APPENDIX I.

Other Wildlife Species Observed on the Proposed Mesquite Arid Landfill Site

APPENDIX I. Other Wildlife Species Observed on the Proposed Mesquite Regional Landfill Site. (See ESI [1991] and Karl [1992a] for plant list.)

VERTEBRATES (Individuals seen, unless noted)

REPTILES

Desert Iguana (*Dipsosarus dorsalis*)
Zebra-tailed Lizard (*Callisaurus draconoides*)
Desert Spiny Lizard (*Sceloporus magister*)
Side-blotched Lizard (*Uta stansburiana*)
Desert Horned Lizard (*Phrynosoma platyrhinos*) (scat)
Western Whiptail (*Cnemidophorus tigris*)

Coachwhip (*Masticophis flagellum*)
Gopher Snake (*Pituophis melanoleucus*)
Western Patch-nosed Snake (*Salvadora hexalepis*)
Western Diamondback Rattlesnake (*Crotalus atrox*)

BIRDS

Turkey Vulture (*Cathartes aura*)
Gambel's Quail (*Callipepla gambelii*)
White-winged Dove (*Zenaida asiatica*)
Lesser Nighthawk (*Chordeiles acutipennis*)
Ash-throated Flycatcher (*Myiarchus cinerascens*)
Common Raven (*Corvus corax*)
Verdin (*Auriparus flaviceps*)
Loggerhead Shrike (*Lanus ludovicianus*)
Northern Mockingbird (*Mimus polyglottos*)
Black-throated Sparrow (*Amphispiza bilineata*)

MAMMALS

Black-tailed Hare (*Lepus californicus*)
Antelope Ground Squirrel (*Ammospermophilus leucurus*)
Round-tailed Ground Squirrel (*Spermophilus tereticaudus*) (burrows, call)
Desert Wood Rat (*Neotoma lepida*)
Kit Fox (*Vulpes macrotis*) (burrows, tracks)
Coyote (*Canis latrans*) (scat)
Badger (*Taxidea taxus*) (burrows, tracks)
Burro Deer (*Odocoileus hemionus eremicus*) (scat, tracks)

MESQUITE REGIONAL LANDFILL EIS/EIR

APPENDIX D-4

DESERT TORTOISE INVENTORY GOSSER EXCHANGE PROPERTIES

JULY 17, 1992

GOSSER EXCHANGE PROPERTIES

DESERT TORTOISE INVENTORY

FINAL REPORT

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July 17, 1992

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SUMMARY

Gold Fields Operating Company will purchase land for a 1:1 exchange with the Bureau of Land Management for public lands inside their Mesquite Mine site near Brawley, California. Three full sections (Palo Verde Section 1, Palo Verde Section 11, and Palo Verde Section 21) plus two quarter-sections (Coachella Section 7 and Coachella Section 23) were surveyed to determine habitat quality for desert tortoises and estimate tortoise abundance on these properties in order to determine their value as exchange sites.

The majority of Palo Verde Section 1 is fair to moderate habitat, supporting moderate numbers of tortoises at best, probably 25 to 50 tortoises ≥140mm in carapace length per square mile. Palo Verde Sections 11 and 21 are poorer habitat than Section 1. The habitat and sign observed suggest that tortoise densities are low, perhaps 15 to 25 tortoises per square mile. No tortoise sign was found on either of the Coachella sites, although tortoises may occupy Section 7, in very low numbers. Both Coachella sites area surrounded by non-tortoise habitat and agricultural development on the adjacent flats effectively blocking their connection to regional tortoise populations..

In conclusion, the Palo Verde properties, especially PV-1 and the eastern portion of PV-11, appears to represent a reasonable exchange for lands at the Mesquite Mine, relative to habitat quality and tortoise abundance. They may also assist tortoise conservation efforts because of their proximity to the core tortoise population inhabiting the Chuckwalla Bench ACEC, as long as (1) recreational activities do not escalate in the area and (2) the BLM's continued goal is to acquire all private lands between the Palo Verde properties and Chuckwalla Bench ACEC. With respect to tortoises, the Coachella properties are an inadequate exchange for land lost at Mesquite.

1.0 INTRODUCTION

1.1 Background of the Surveys

Gold Fields Operating Company (GFOC) is currently operating a 6,000-acre gold mine, the Mesquite Mine, near Brawley, Imperial County, California. GFOC has agreed to purchase land for a 1:1 exchange with the Bureau of Land Management's (BLM) for public lands inside the mine site. Exchange sites must be mutually agreed upon by GFOC and BLM. Factors under consideration include, but are not limited to, habitat quality relative to desert tortoises. The desert tortoise, *Gopherus agassizii*, is a species of special concern inhabiting the mine site. The desert tortoise is a federally-listed Threatened species (Federal Register 12178, 2 April 1990) in California, Nevada, Utah, and parts of Arizona and a California state-listed Threatened species (California Fish and Game Commission, Section 670.5, 22 June 1989).

Three full sections plus two quarter-sections, hereafter referred to as the Gosser properties, are candidates for compensation properties. The purpose of this study was to determine habitat quality for desert tortoises and estimate tortoise abundance on these properties in order to determine their value as exchange sites for BLM land on the mine site. Other biological considerations were assessed by another firm and are presented in a separate report to ESI.

2.0 SITE DESCRIPTION

2.1 Locations of Sites

2.1.1 Mesquite Mine - The Mesquite Mine is located in eastern Imperial County, California, roughly 35 miles northeast of Brawley (See ESI, 1992, for maps of all sites). The legal description is Township 13 South, Range 19 East, sections 3, 4, 5, 6, 7, 8, 9, 10, 15, 16, 17, 18, 19, 20, 21, 28, and 33.

2.1.2 Palo Verde Section 1 (PV-1) - Section 1 is located approximately 25 miles southeast of Blythe in Township 9 South, Range 19 East, along the northern Imperial County border .

2.1.3 Palo Verde Section 11 (PV-11) - Section 11 is southeast and adjacent to PV-1.

2.1.4 Palo Verde Section 21 (PV-21) - Section 21 is also in Township 9 south, Range 19 East, west-southwest of PV-1.

2.1.5 Coachella Section 7 (C-7) - This site encompasses the northern quarter of Section 7, Township 7 South, Range 7 East, approximately 13 miles southwest of Coachella, Riverside County, California.

2.1.6 Coachella Section 23 (C-23) - This site encompasses the northern half of the southern half of Section 23, Township 7 South, Range 7 East, approximately 9 miles south of Coachella.

2.2 Habitat

2.2.1 PV-1 - PV-1 lies at approximately 800 feet in elevation. A large, densely-vegetated, arboreal wash bisects the section from the northeast corner, forking in the southwestern quarter. This wash is dominated by ironwood (*Olneya tesota*), palo verde (*Cercidium floridum*), creosote bush (*Larrea tridentata*), big galleta (*Hilaria rigida*), cheesebush (*Hymenoclea salsola*), and boxthorn (*Lycium andersonii*). North of the wash, several small arboreal washes, <10 yards wide each, cross the section. Between these washes is a fairly homogeneous creosote bush community, with approximately 15 to 20% cover. The soil is a soft, mostly fine-gravelly loam. In the southern portion of the section are broad expanses of well-consolidated black, mostly fine-gravelly pavement over soft, gravelly, silty loam. These flats are intersected by narrow (<20 yards wide) low areas with moderately dense creosote bush, big galleta, burro bush (*Ambrosia dumosa*) and common ironwood, palo verde, catclaw acacia (*Acacia greggii*), and ratany (*Krameria parvifolia*). Dominant ephemerals include cambess (*Oligomeris linifolia*), rigid spiny-herb (*Chorizanthe rigida*), plantain (*Plantago insularis*, forget-me-not (*Cryptantha* sp.), Arabian grass (*Schismus arabica*), pincushion (*Chaenactis* spp.), and pepper grass (*Lepidium lasiocarpum*). While the topography for most of the section is flat, the southeast corner hosts low hills of dense, loose basaltic and limestone gravel and cobbles with scattered boulders.

PV-1 lies in a checkerboard of private and public land holdings. Disturbance from recreational activities appear to be minimal, although several recreational vehicles were seen on the dirt road crossing the site and there are three campgrounds to the immediate north, from one to four miles away. Public lands in the area are designated as Limited use by the BLM (USDI 1980). No grazing allotments are designated for the area and no trespass was observed

2.2.2 PV-11 - PV-11 lies adjacent to PV-1 and the elevation, disturbance levels and habitat are nearly identical to those in the southwestern portions of PV-1. The notable exception is the topography, which is more rolling over the eastern and western portions of the section. The substrate on these sparsely-vegetated hills is slatey limestone and basaltic gravel. Low areas in the northwest quarter are poorly consolidated, limestone pavement over soft to hard, gravelly, chalky silty loam and silt.

2.2.3 PV-21 - PV-21 is slightly higher than the other two nearby sections, approximately 1000 feet in elevation. Disturbance levels are similar, although the adjacent section to the north is managed by the State of California as a geode bed attraction for collectors. Most of the center of the section comprises undulating to gently rolling, broad expanses of dense, basaltic, gravel pavement cut by a few small channels and a forked arboreal wash. This area is sparsely vegetated with creosote bush, brittlebush, and burro bush; in the flattest areas, there is little shrub layer vegetation except in the channels. The northeastern portion of the section hosts low hills of loose talus and angular volcanic bedrock. Several hills are located in the western portion also and mountains of bedrock and talus line the western edge of the section.

2.2.4 C-7 - The elevation on this portion of Section 7 ranges from 1100 to 2300 feet. The topography comprises steep to moderately steep hills (≥30% slopes) with dense granitic bedrock and boulders. Some soil interface occurs as a result of the exfoliating granite and shrubs and herbaceous perennials are moderately sparsely scattered throughout. These include primarily creosote bush and burro bush, with common brittlebush, Mormon Tea (*Ephedra nevadensis*), buckhorn cholla (*Opuntia acanthocarpa*), dalea (*Psorothamnus fremontii*), Chuckwalla bush (*Bebbia juncea*), sage (*Hyptis emoryi*), and ocotillo (*Fouquieria splendens*). Barrel cactus (*Ferocactus acanthodes*), desert fir (*Peucephyllum schottii*), and agave (*Agave* sp.) are minor elements. The habitat to the north, west, and south of Section 7 appears to be similar to that on Section 7. Northeast of Section 7 is an alluvial fan with a moderate density of creosote bush and burro bush; the substrate is fine-gravelly with scattered large gravel over soft, coarse, loamy sand. Much of the area is in agricultural production; past one mile northeast, the entire habitat has been converted to agricultural production.

2.2.5 C-23 - Section 23, situated in the Santa Rosa Mountains, is extremely steep, with typical slopes greater than 70% and elevations ranging from 900 to 2500 feet. The substrate is angular blocky and bouldery granite, with extensive talus in patches. Shrub layer vegetation is limited to sparse creosote bush with burro bush and brittlebush. The surrounding sections are similar habitat. The flats to the east and northeast are entirely in agricultural production with the exception of a small patch of allscale (*Atriplex polycarpa*).

3.0 SURVEY METHODS

The goal of the survey was to estimate habitat quality for tortoises and relative abundance (e.g., high, medium, low). A 25% cover, with more concentrated searches in the best microhabitat sites, was all that was necessary to meet this goal. (Any heterogeneity in tortoise dispersion would be averaged because of the number of transects and size of the unit surveyed.)

Surveys were conducted between 27 and 30 May 1992. The weather was clear and there had been no rain for over two months. Six people conducted the surveys, three with extensive experience searching for and identifying sign, two with moderate experience, and one with no tortoise experience. (The latter person was always teamed with one of the most experience observers.) Survey methods varied slightly from site to site, but the protocol generally involved two to six people walking a swath of more-or-less parallel transects the length of the section being surveyed (Figure 1). Transects within the swath were approximately 20 yards apart, with a 120-yard swath skipped between surveyed swaths. Drainages were searched more thoroughly than open areas. A total of 42 to 44 on sections 1, 11, and 21. On Site C-7, subjective searches were made in the best habitat (washes, boulder piles, soil interfaces) for 8 hours. On Site C-23, the site was visited and described, but it was determined that it was non-habitat for tortoises, so it was not sampled further. For both C-7 and C-23, the nearest habitat on the flats was assessed for habitat quality. All tortoise sign (e.g., burrows, scat, tortoises, carcasses, tracks, drinking sites, and eggshell fragments) observed was recorded, mapped, and described as to size and condition. Additionally, canid scat, raptor pellets, and woodrat nests were carefully examined for tortoise parts to establish tortoise presence. Habitat was also mapped with regard to vegetation, soils, and topography and locations of individual disturbances. The aspect-dominant perennial and annual vegetation were recorded as well as the less common species; density was estimated occularly. Topography was described as well as relief height and slopes and the nature of the drainages. Substrates and soils were cursorily examined to provide an estimation of coarse particulate content, consistence, and texture.

4.0 RESULTS

4.1 PV-1

PV-1 is higher habitat quality than the remaining Gosser properties or Mesquite Mine Section 16. This is reflected in the greater numbers of total sign (Table 1) and tortoise burrows alone (Tables 2 and 3). The majority of PV-1 is fair to moderate habitat, supporting moderate numbers at best, probably 25 to 50 tortoises ≥140mm in carapace length per square mile. (Berry and Nicholson's [1984] estimates for this area were also 20 to 50 tortoises per square mile.) This estimate is based on survey results (i.e., sign numbers and comparison to Section 16) as well as the experience of the author in assessing habitat quality. Of particular importance in the evaluation of habitat quality is forage quality and quantity, percent shrub cover and evenness, soil types, and disturbance levels. On PV-1, with the exception of the drainages, shrub diversity is low (primarily creosote bush), suggesting low densities of tortoises. Most tortoise sign was associated with drainages. Soils are also a little too silty and gravelly to represent good burrowing potential (except in the swales). Both forage and cover quality are compromised by the broad expanses of desert pavement in the southern portion of the section (reflected in the lower number of sign [Figure 1]). North of the major wash, cover and forage both increase and the soil is more loamy. The mountains in the southeastern corner of the section are poor tortoise habitat. Cover is sparse and the substrate generally is too coarse (boulders, cobbles, large gravel) and loose, limiting both travel and coversite potential. Only one sign, a scat, was found in this area.

4.2 PV-11

The habitat and sign observed suggest that tortoise densities are low, perhaps 15 to 25 tortoises per square mile. This section is poorer habitat than PV-1, in general, being too open (associated with low cover and forage) to support even a moderate population of tortoises. The habitat is also of slightly lower quality than Section 16, at the Mesquite Mine Site. The similar number of tortoise burrows found to that on Section 16 may be a sampling artifact, due to the open and easily surveyed habitat on PV-11. Alternatively, however, impacts relative to the mine's operations and Highway 78 may have decreased the Section 16 tortoise population in recent years.

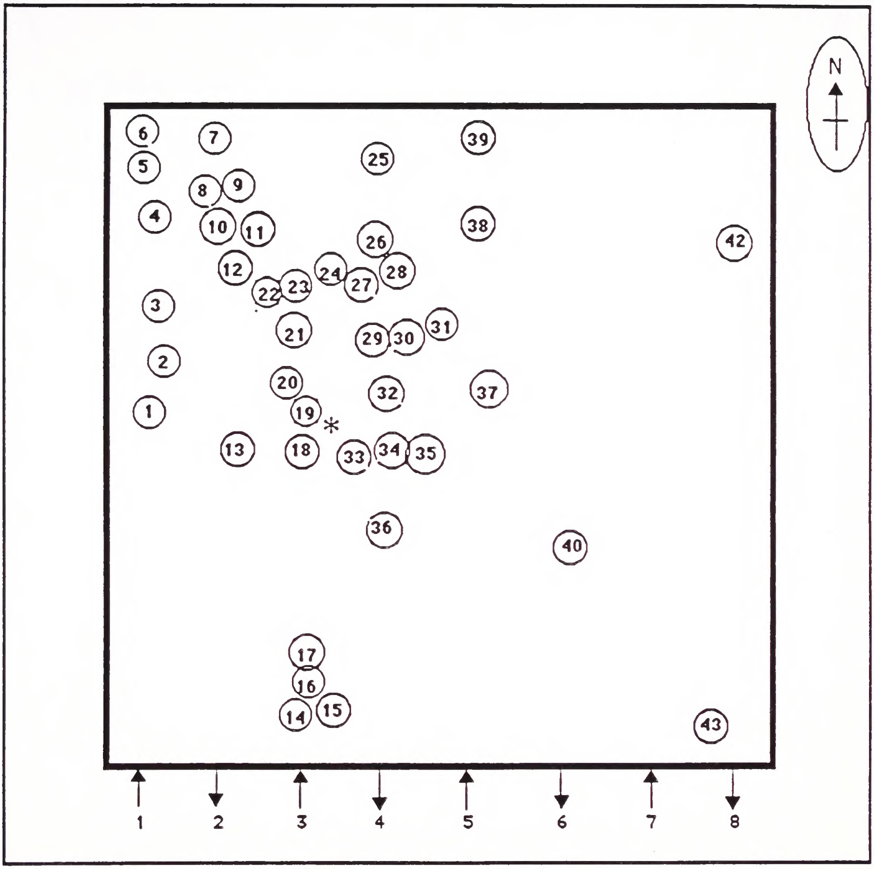

FIGURE 1A. Schematic location of transects and tortoise sign on Section 1 : Gosser Exchange Properties

↑ - Transect Swath (number, direction of travel, location)

(1) - Tortoise Sign (Reference: Table 1)

* - Old Kit Fox Natal Den

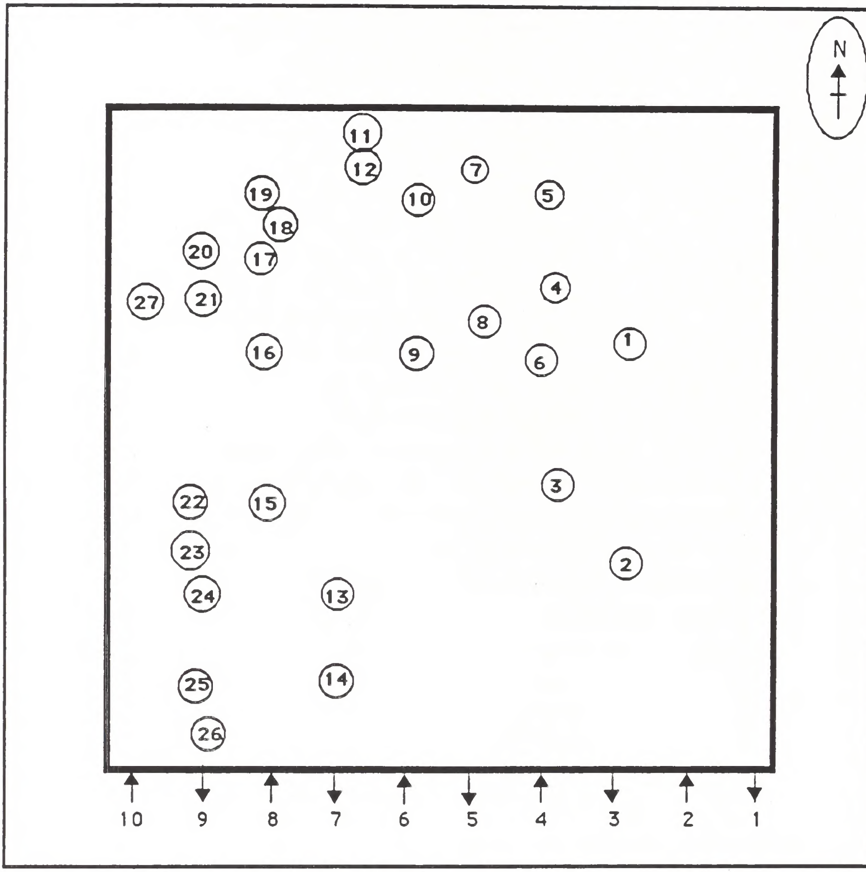

FIGURE 1B. Schematic location of transects and tortoise sign on Section 11: Gosser Exchange Properties

↑ - Transect Swath (number, direction of travel, location)

(1) - Tortoise Sign (Reference: Table 1)

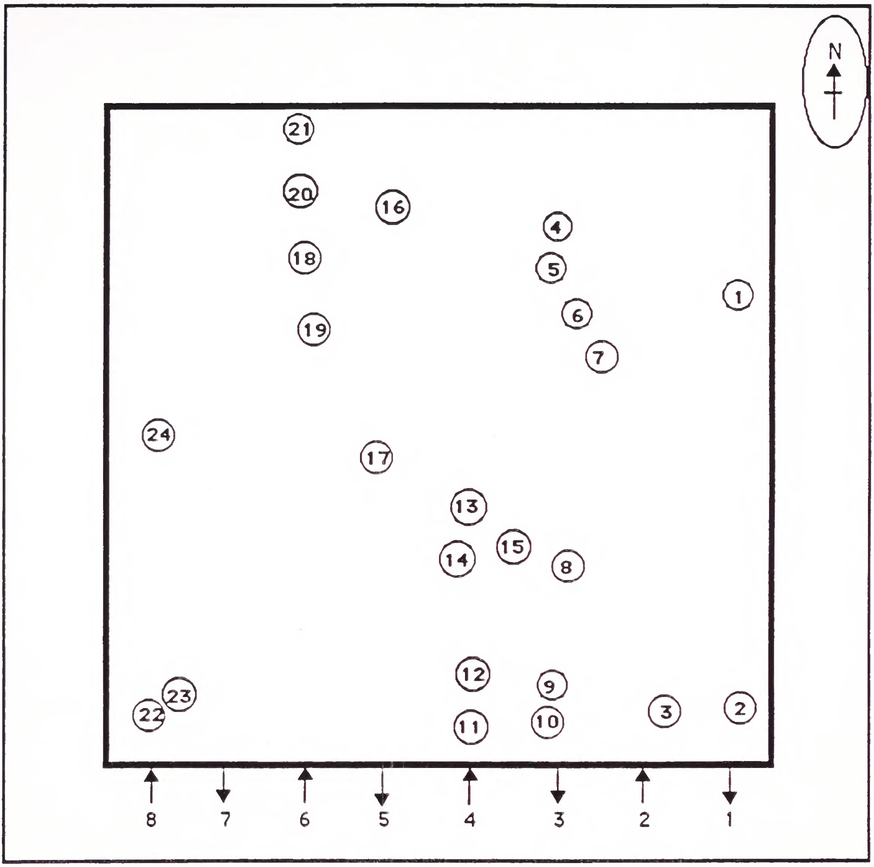

FIGURE 1C. Schematic location of transects and tortoise sign on Section 21: Gosser Exchange Properties

 - Transect Swath (number, direction of travel, location)

 - Tortoise Sign (Reference: Table 1)

Table 1. Results of Surveys for Tortoise Sign on the Gosser Exchange Properties

Section	Transect Swath	Sign No.	Sign Type	Class (a)	Width (mm)	Comments
PV-1	1	1	Burrow	2	340	
		2	Burrow	4	165	
		3	Burrow	4	220	
		4	Burrow	2	310	
		5	Scat	2	18	
		6	Burrow	5	260	
	2	7	Shell	1-2 years	MCL=212	Female
		8	Burrow	6	260	
		9	Burrow	3	300	
		10	Burrow	3	225	
		11	Burrow	3	320	
		12	Scat	2	15	
		13	Burrow	3	200	
	3	14	Burrow	1	375	Tortoise
		15	Burrow	1	180	Tortoise
		16	Burrow	1	160	Within 30 feet of Sign No.15
		17	Pallet	3	200	
		18	Burrow	6	210	
		19	Pallet	3	280	
		20	Burrow	3	360	
		21	Burrow	2	320	
		22	Pallet	2	260	
		23	Burrow	1	310	
		24	Pallet	1	260	
	4	25	Burrow	1	260	
		26	Burrow	5	270	
		27	Scat	3	18	
		28	Burrow	2	230	
		29	Burrow	1	310	Tortoise
		30	Burrow	1	310	1 yard from Sign No. 29
		31	Burrow	2	120	
		32	Burrow	4	190	
		33	Burrow	4	255	
		34	Scat	3	14	
		35	Burrow	1	280	
		36	Burrow	3	295	
	5	37	Burrow	6	310	
		38	Burrow	1	190	
		39	Burrow	3	220	
	6	40	Burrow	1	190	
	7	41	Burrow	2	330	
	8	42	Burrow	3	260	
		43	Scat	2	20	
PV-11	3	1	Burrow	3	320	
		2	Burrow	1	360	
	4	3	Burrow	1	310	Tortoise
		4	Scat	2	23, 24	
		5	Burrow	1	230	
		6	Burrow	1	300	Tracks
	5	7	Burrow	5	180	
		8	Burrow	3	170	
	6	9	Scat	2	24	
		10	Burrow	4	290	
	7	11	Burrow	1	305	
		12	Scat	1	25	
		13	Scat	2	14, 15	
		14	Pallet	2	340	
	8	15	Burrow	1	360	

Section	Transect Swath	Sign No.	Sign Type	Class (a)	Width (mm)	Comments
PV-11, cont.	8, cont.	16	Burrow	5	340	
		17	Burrow	3	350	
		18	Scat	2	23	
		19	Burrow	1	230	
	9	20	Tortoise	---	MCL=220	Female
		21	Scat	1	20	
		22	Burrow	2	240	
		23	Burrow	1	280	
		24	Burrow	2	310	
		25	Burrow	1	280	Tracks
		26	Pallet	3	280	
	10	27	Scat	1	29	
PV-21	1	1	Burrow	6	400	
		2	Burrow	2	290	
	2	3	Burrow	2 (5)	400	
	3	4	Burrow	2	320	
		5	Scat	3	12	
		6	Burrow	1	220	Tracks
		7	Scat	3	13	Within 30 yards of Sign No.6
		8	Burrow	1	240	Tortoise
		9	Burrow	6	285	
		10	Burrow	1	280	
	4	11	Burrow	1	290	Scat
		12	Burrow	2	300	
		13	Scat	3	24	
		14	Burrow	1	260	Tortoise
		15	Burrow	1	260	Within 10 feet of Sign No. 14
	5	16	Pallet	2	290	
		17	Burrow	4	180	
	6	18	Burrow	1	265	
		19	Burrow	1	190	
		20	Burrow	1	140	
		21	Scat	3	13	
	8	22	Burrow	2	300	
		23	Scat	3	11, 20	
		24	Burrow	4	260	

(a) Sign Classes Reflect Age of Sign as Follows:

Burrows: Class 1 - Definitely tortoise, fresh
2 -Definitely tortoise, used this activity season
3 -Definitely tortoise, not used this season
4 -Questionably tortoise, in good condition
5 -Definitely tortoise, deteriorated
6 -Questionably tortoise, deteriorated

Scat: Class 1 -Fresh
2 -Dark, this season
3 -Somewhat to very bleached

Table 2. Comparison of burrow counts on Section 16 clearance with Gosser Exchange Properties, adjusted for comparability at 100% cover (see footnotes for calculations). (Only burrows wider than 140 mm were used because of consistency of visibility [see Karl 1989 for review].)

	Burrow Class					
Section	1	2	3	4	5	6
16[1]	18	10	22	22	14	42
PV-1[2]	40	28	40	16	8	12
PV-11[2]	36	12	16	4	8	0
PV-21[2]	36	24	0	8	0	8

1 - Total number of sign observed was multiplied by 2 for comparability to 100% cover over a square mile.
2 - Total number of sign observed was multiplied by 4 for comparability to 100% cover.

Table 3. Comparison of definite tortoise burrow (exceeding 140mm in width) counts on Section 16 clearance survey with Gosser Exchange Properties, adjusted for comparability (see Table 2).

	Definite Tortoise Burrows		
Section	Class 1,2,3,5[1]	Class 1 and 2[2]	Class 1,2, and 3[3]
16	64	28	50
PV-1	116	68	108
PV-11	72	48	64
PV-21	60	60	60

1 - Total number of definite tortoise burrows.
2 - Burrows of the current year only.
3 - Burrows of the current year plus good-quality burrows of previous activity seasons (allows for mistaken identification of Class 2 burrows as Class 3).

4.3 PV-21

The comments for PV-11 apply to PV-21. The habitat is too open and the substrate too gravelly for high quality tortoise habitat. Both factors limit forage potential and burrowing potential. The hills in the east and the mountains in the west are loose talus and angular bedrock, both of which limit burrowing potential (although tortoises could occupy select microsites)

4.4 C-7

While no tortoise sign was found, tortoises may occupy this site, in very low numbers. The habitat is inherently moderate tortoise habitat in many areas, with coversites offered by bedrock and boulders and soil interfaces with the exfoliating rock. The shrub layer is moderately diverse and suggestive of tortoise presence (species, percent cover), with the exception of agave. However, the steepness of much of the surrounding terrain limits tortoise habitation. The value of the habitat is further compromised by agricultural development on the adjacent flats.

4.5 C-23

This site is primarily non-tortoise habitat. The coversite and travel potential is poor because of the steepness of the terrain, the dense talus, and the angular-blocky bedrock. Surrounding habitat is similar. The flats to the east have been developed for agriculture. Even though some microsites could support tortoise habitation, the generally poor quality of the habitat indicate that tortoises do not occupy the site.

4.6 Other Special Resources

Native American pottery shards were located in PV-11, approximately 200 yards north of the dirt road (MO51), mid-section. The pottery was low-fire clay, handbuilt, and fired or used in a fire.

5.0 DISCUSSION

For an even exchange in acreage, the value of exchange properties should exceed that of properties removed from the public domain unless the property is insular. This is because the acreage lost is part of the regional "network"; i.e., the population and community (plant and animal) effects are farther-reaching than the boundaries of the property. Potential exchange property values must be evaluated relative to the quality of the habitat for the long-term survival of the local community, species populations, and specific species. Specific criteria relative to desert tortoises include:

1) Is the habitat at the exchange property better than at the development site and are there more tortoises?
2) Are the exchange properties categorized (BLM categories) at the level of or above those at the development site?
3) Are the exchange properties located at or near a targeted acquisition area for the BLM's tortoise management program?
4) What is the level of disturbance and private land ownership associated with the exchange property, including that relative to separating the proposed exchange lands from the nearest core population?
5) Relative to inherent habitat quality, how connected is the tortoise population on the target area or core population with that on the exchange lands?

In response to the first issue, the Gosser Palo Verde properties are more valuable than the Mesquite Mine lands that they would replace. Tortoise densities and habitat quality are roughly similar , although PV-11 and PV-21 probably have lower densities than were originally at the Mesquite Mine site. The Coachella properties are an inadequate replacement for land lost at Mesquite. Not only are they non-tortoise habitat (C-23) or questionable tortoise habitat (C-7), but they are surrounded by non-habitat and agriculture, effectively blocking their connection to regional tortoise populations.

BLM tortoise category maps define GFOC's Mesquite Mine as uncategorized, which is equivalent to the low-priority Category 3 because of the known presence of tortoises (USDI 1989) . The Palo Verde Gosser properties (i.e., PV-1, PV-11, and PV-21) lie in Category 1 habitat; the Coachella properties are uncategorized. BLM habitat categories, ranging in decreasing importance from Category 1 to Category 3, were designed as management tools to insure future protection and management of these areas and their associated desert tortoise populations (USDI 1988). (Note: These category maps roughly coincide with the U.S. Fish and Wildlife Service [FWS] class maps for tortoises, which are based on density and habitat. However, FWS is no longer using their class maps.) Thus, these categorizations are based not solely on tortoise density and the quality of the habitat, but also on other land-use conflicts and estimated local tortoise population trends. Category I habitat areas are considered essential to maintenance of large, viable populations, have primarily medium to high density populations, and have resolvable conflicts. Category III habitat areas are not considered essential to maintenance of viable populations, are thought to have low to medium density populations isolated from higher density populations, and have unresolvable conflicts.

In their plan for the management of the desert tortoise, the Bureau of Land Management (BLM) presented the goal to "consolidate Category 1 and 2 habitats through an acquisition program and through compensation for losses in Category 1, 2, and 3 habitats" (U.S. Department of the Interior [USDI] 1988). To this end, Recommendation Number 30 allows for the "exchange or disposal of Category 2 and 3 habitats only if accompanied by an adequate compensation package involving acquisition of Category 1 habitat". Recommendation Number 31 of the BLM's tortoise management plan calls for land acquisition in priority areas, with the goal of maximizing long-term viability of the desert tortoise. The Gosser Palo Verde properties are located in a Priority 2 area, 6 miles from the high-priority Chuckwalla Bench Desert Tortoise Area of Critical Environmental Concern (ACEC). GFOC is already involved in a habitat acquisition program in the Chuckwalla Bench (ACEC), to compensate for tortoise habitat lost in association with Mesquite mining activities. Acquisition of private lands nearby this ACEC, to exchange with the BLM for public lands inside the mine site, could strengthen the BLM's program for tortoise management. The Coachella properties are not located in or near a targeted acquisition area.

The issue of connectedness, because of inherent habitat quality and the potential for disturbance between the Palo Verde properties and the Chuckwalla Bench ACEC, is an issue warranting consideration. While there are undoubtedly corridors of habitat between these areas (Berry and Nicholson [1984] state that tortoise densities in some of this area are 50 to 100 tortoises per square mile), topographical maps suggest that there is substantial non-habitat. (A habitat reconnaissance in that area would be useful for determining the connectedness of the habitat.) There is also a substantial amount of private land between the Palo Verde properties and the Chuckwalla Bench ACEC. Unless all such lands are being targeted for ultimate addition to the ACEC, some could be developed in a counterproductive manner for tortoises, especially if the emphasis were recreation. Such a situation would exacerbate the deficiency in good habitat between the Palo Verde properties and the ACEC. Small fragments of habitat separated from the core population would be of little value to the population or species and would be subject to an escalated rate of extirpation. Since there are already several campgrounds in the area, the potential for expanded recreational activities should be carefully considered.

In conclusion, acquisition of the Palo Verde properties, especially PV-1 and the eastern portion of PV-11, appears to represent a reasonable exchange for lands at the Mesquite Mine, relative to habitat quality and tortoise abundance. They may also assist tortoise conservation efforts because of their proximity to the core tortoise population inhabiting the Chuckwalla Bench ACEC, as long as (1) recreational activities do not escalate in the area and (2) the BLM's continued goal is to acquire all private lands between the Palo Verde properties and Chuckwalla Bench ACEC. With respect to tortoises, the Coachella properties are an inadequate exchange for land lost at Mesquite.

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APPENDIX I.

Partial Plant Species List and Other Wildlife Species Observed on the Gosser Exchange Properties

APPENDIX I. Partial Plant Species List and Other Wildlife Species Observed on the Gosser Exchange Properties

VERTEBRATES (Individuals seen, unless noted)

REPTILES

Desert Iguana (*Dipsosarus dorsalis*)
Chuckwalla (*Sauromalus obesus*)
Collared Lizard (*Crotaphytus insularis*)
Zebra-tailed Lizard (*Callisaurus draconoides*)
Desert Spiny Lizard (*Sceloporus magister*)
Side-blotched Lizard (*Uta stansburiana*)
Desert Horned Lizard (*Phrynosoma platyrhinos*)
Western Whiptail (*Cnemidophorus tigris*)

BIRDS

Turkey Vulture (*Cathartes aura*)
Gambel's Quail (*Callipepla gambelii*)
White-winged Dove (*Zenaida asiatica*)
Lesser Nighthawk (*Chordeiles acutipennis*)
Red-tailed Hawk (*Buteo jamaicensis*)
Ash-throated Flycatcher (*Myiarchus cinerascens*)
Common Raven (*Corvus corax*)
Verdin (*Auriparus flaviceps*)
Cactus Wren (*Campylorhynchus brunneicapillum*)
Rock Wren (*Salpinctes obsoletus*)
Black-tailed Gnatcatcher (*Polioptila melanura*)
Loggerhead Shrike (*Lanus ludovicianus*)
Black-throated Sparrow (*Amphispiza bilineata*)

MAMMALS

Black-tailed Hare (*Lepus californicus*)
Antelope Ground Squirrel (*Ammospermophilus leucurus*)
Round-tailed Ground Squirrel (*Spermophilus tereticaudus*) (Questionable identification: burrows, call)
Desert Wood Rat (*Neotoma lepida*)
Kit Fox (*Vulpes macrotis*) (burrows, tracks)
Coyote (*Canis latrans*) (scat)
Badger (*Taxidea taxus*) (burrows, tracks)
Burro Deer (*Odocoileus hemionus eremicus*) (scat, tracks)
Burro (*Equus asinus*) (scat)

GERANIACEAE
Heron's-bill (*Erodium texanum*)

ZYGOPHYLLACEAE
Creosote Bush (*Larrea tridentata*)

MALVACEAE
Five-spot (*Malvastrum rotundifolium*)
Desert Mallow (*Sphaeralcea ambigua*)

FOUQUIERIACEAE
Ocotillo (*Fouquieria splendens*)

LOASACEAE
Blazing Star (*Mentzelia* spp.)

CACTACEAE
Cottontop Cactus (*Echinocactus polycephalus*)
Calico Cactus (*Echinocereus engelmannii*)
Barrel Cactus (*Ferocactus acanthodes*)
Corky-seed Fishhook (*Mammillaria tetrancista*)
Beavertail Cactus (*Opuntia basilaris*)
Buckhorn Cholla (*O. acanthocarpa*)
Silver Cholla (*O. echinocarpa*)
Pencil Cholla (*O. ramosissima*)

ONAGRACEAE
Primrose (*Camissonia boothii*)

ASCLEPIADACEAE
Climbing Milkweed (*Sarcostemma hirtellum*)

POLEMONIACEAE
Phlox (*Gilia mathewsii*)

HYDROPHYLLACEAE
Purple-mat (*Nama demissum*)
Notch-leaved Phacelia (*Phacelia crenulata*)

BORAGINACEAE
Nevada Forget-me-not (*Cryptantha nevadensis*)
Arched-nutted Comb-bur (*Pectocarya recurvata*)

LABIATEAE
Desert Lavender (*Hyptis emoryi*)

SOLANACEAE
Boxthorn (*Lycium andersonii*)

SCROPHULARIACEAE
Ghost-flower (*Mohavea confertiflora*)

PLANTS

EPHEDRACEAE
Mormon Tea (*Ephedra nevadensis*)

AGAVACEAE
Agave (*Agave* sp.)

POLYGONACEAE
Brittle Spine-flower (*Chorizanthe brevicornu*)
Rigid Spiny-herb f(*C. rigida*)
Desert Trumpet (*Eriogonum inflatum*)
Buckwheat (*Eriogonum* spp)

CHENOPODIACEAE
Desert Holly (*Atriplex hymenelytra*)

NYCTAGINAECAE
Windmills (*Allionia incarnata*)
Wishbone bush (*Mirabilis bigelovii*)

PAPAVERACEAE
Desert Gold-poppy (*Eschscholtzia glyptosperma*)\
Little Gold-poppy (*E. minutiflora*)

CRUCIFERAE
Pepper-grass (*Lepidium flavum*)
Pepper-grass (*L. lasiocarpum*)
Long-beaked Twist-flower (*Streptanthella longirostris*)

RESEDACEAE
Cambess (*Oligomeris linifolia*)

EUPHORBIACEAE
Spurge (*Euphorbia albomarginata*)
Stillingia (*Stillingia linearifolia*)

BUXACEAE
Jojoba (*Simmondsia chinensis*)

LEGUMINOSAE
Catclaw Acacia (*Acadia greggii*)
Palo Verde (*Cercidium floridum*)
Silk Dalea (*Dalea mollis*)
Little-leaved Ratany (*Krameria parvifolia*)
Hairy Lotus (*Lotus tomentellus*)
Lupine (*Lupinus* sp)
Ironwood (*Olneya tesota*)
Mesquite (*Prosopis juliflora*)
Dalea (*Psorothamnus fremontii*)
Smoke-tree (*P. spinosa*)

PLANTAGINACEAE

Plantain (*Plantago insularis*)

COMPOSITAE

Burro Bush (*Ambrosia dumosa*)
Chuckwalla Bush (*Bebbia juncea*)
Pincushion Flower (*Chaenactis* spp)
Brittlebush (*Encelia farinosa*)
Encelia (*E. virginensis*)
Eriophyllum (*Eriophyllum wallacei*)
Cheesebush (*Hymenoclea salsola*)
Desert Dandelion (*Malacothrix glabrata*)
Spanish Needle (*Palafoxia lineris*)
Odora (*Porophyllum gracile*)
Velvet Rosette (*Psathyrotes ramosissima*)
California Chicory (*Rafinesquie neomexicana*)
Bedstraw (*Stephanomeria pauciflora*)
Yellow-head (*Trichoptilium incisum*)

GRAMINAE

Three-awn (*Aristida* sp)
Fluff Grass (*Erioneuron pulchellum*)
Big Galleta (*Hilaria rigida*)
Arabian Grass (*Schismus arabicus*)

MESQUITE REGIONAL LANDFILL EIS/EIR

APPENDIX D-5

BIOLOGICAL INVENTORY: DESERT TORTOISE HABITAT EVALUATION: PROPOSED GAS PIPELINE

DECEMBER 1992

BIOLOGICAL INVENTORY; MESQUITE REGIONAL LANDFILL

Desert Tortoise Habitat Evaluation: Proposed Gas Pipeline

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(Originally submitted October 1992)

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SUMMARY

This report containst the results of a tortoise habitat evaluation reconnaissance survey of the 31-mile, proposed gas pipeline alignment for the Mesquite Regional Landfill between approximately Glamis and Niland, Imperial County, California.

The proposed pipeline route occurs in a 70- to 230-foot-wide, disturbed corridor between the Southern Pacific railroad and a dirt service road south of the railroad. Most of the habitat within the corridor is poor to non-habitat because of inherent habitat quality and/or the prior and ongoing disturbance. The corridor has been graded in the past 10 years and has few perennial shrubs, although there exists moderately dense ephemeral vegetation. While tortoise habitat exists on either side of the railroad from Flowing Wells east, the pipeline corridor itself probably provides only foraging (from ephemeral vegetation) or transit sites for local tortoises.

Few tortoises would be encountered during construction in this corridor, irrespective of its current level of disturbance, because: (1) habitat on either side of the railroad is largely only of fair quality (i.e. tortoises probably present in low numbers); (2) the railroad probably serves as a mortality sink for adjacent tortoises; (3) the Algodones Dunes (non-habitat) parallel the corridor at most 0.25 miles south, from Milepost 0 (Glamis) to Milepost 18.3 (Mammoth Wash); and (4) there is no habitat either in or surrounding the corridor from Milepost 27.2 (Flowing Wells) to Milepost 32.1 (Niland). It is estimated that, at most, five tortoises would be encountered during construction.

Because of the prior and ongoing disturbance within the corridor, there is no basis for compensation of habitat disturbed during pipeline construction. It would be advisable, however, to avoid tortoise mortalities during construction by using a monitor whose sole purpose is to seek and remove tortoises that could be in danger.

DESERT TORTOISE HABITAT EVALUATION: PROPOSED GAS PIPELINE

1.0 INTRODUCTION

1.1 Background of the Proposed Project

Arid Operations proposes to construct and operate a landfill in Imperial County, California. The proposed landfill would occupy an area adjacent to and within Gold Fields Operating Co.'s (GFOC) existing mining operations boundary and would be serviced by a natural gas pipeline alongside the existing Southern Pacific Railroad track from Glamis to Niland.

1.2 Biological Resources - Desert Tortoise

The desert tortoise, *Gopherus agassizii*, is a species of special concern inhabiting the proposed site. The desert tortoise is a federally-listed Threatened species (Federal Register 12178, 2 April 1990) in California, Nevada, Utah, and parts of Arizona, and a California state-listed Threatened species (California Fish and Game Commission, Section 670.5, 22 June 1989). Tortoise density surveys on the proposed landfill site and associated rail spur were completed in May 1992 (Karl, A. 1992. "Biological Assessment for Mesquite Mine and Arid Landfill - Desert Tortoise Surveys, Final Report").

This report documents the results of habitat quality surveys for desert tortoises along the proposed gas pipeline.

2.0 SITE DESCRIPTION

The proposed gas pipeline route follows the existing Southern Pacific Railway bed for approximately 31 miles from Glamis (35 miles east of Brawley, Imperial County) to Niland (approximately 18 miles north of Brawley) (Figure 1). The pipeline is planned to lie in the narrow strip between the Niland-Glamis dirt road and the railroad. This corridor varies from 70 to 230 feet in width and hosts 1 or more of the following disturbances at any point (e.g., Figure 2): (1) 2 double-arm wooden pole power lines; (2) a Santa Fe Pacific gas pipeline; and (3) an MCI telecommunications cable. Extensive earth grading, both recent and past, and/or agriculture are prominent human impacts over all of the line. The Imperial Sand Dunes and the Chocolate Mountains Gunnery Range lie adjacent to the southern and northern borders of the proposed route, respectively.

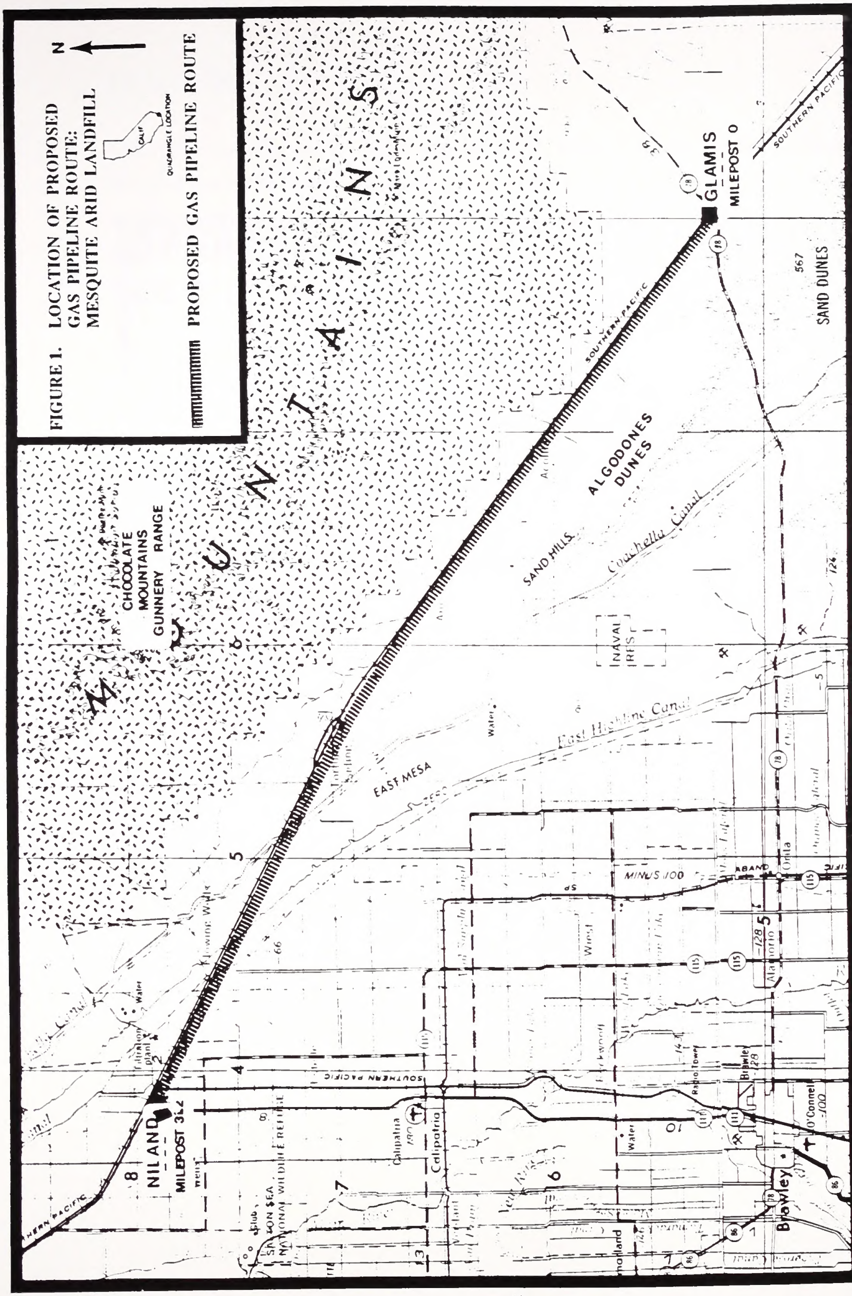
FIGURE 1. LOCATION OF PROPOSED GAS PIPELINE ROUTE: MESQUITE ARID LANDFILL
PROPOSED GAS PIPELINE ROUTE
N
CALIF
QUADRANGLE LOCATION
GLAMIS
MILEPOST 0
NILAND
MILEPOST 32
MOUNTAINS
CHOCOLATE MOUNTAINS GUNNERY RANGE
ALGODONES DUNES
SAND DUNES
567
SAND HILLS
Coachella Canal
East Highline Canal
EAST MESA
NAVAL RES
SOUTHERN PACIFIC
MINUS 100
Calipatria
Brawley
O'Connell
Radio Tower
Water
SALTON SEA NATIONAL WILDLIFE REFUGE

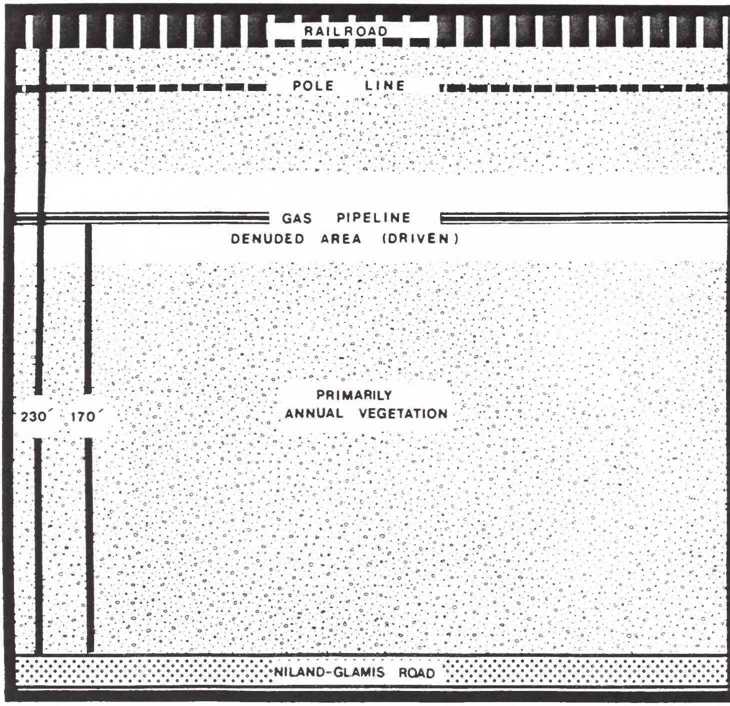

FIGURE 2. Schematic Diagram of Typical Current Disturbances Associated with the Proposed Pipeline Route - Milepost 0.0 to 1.0 (Not to Scale)

3.0 METHODS

This reconnaissance survey was conducted on 8 October 1992. It entailed driving the Niland-Glamis road and assessing habitat variables in order to determine tortoise habitat quality. Numerous stops were made to walk the area for more thorough habitat examination and to examine adjacent habitat that was inaccessible by road. Habitat variables examined included vegetation (e.g., shrub species composition, density, evenness, forage quality, forage availability), soil qualities (e.g., consistence, coarse particles), topography, water flow, and adjacent habitat. Habitat quality relative to tortoises was assessed based on the extensive experience of the investigator in tortoise habitat analysis. Habitat was subsequently categorized using the following system:

1) Non-habitat - No possibility of tortoise use

2) Poor - Tortoises unlikely but possible; if present, occur in very low numbers

3) Fair - Tortoises possible in low numbers (e.g., 30-50 tortoises/mi^2)

4) Moderate - Tortoises likely in moderate to low numbers (e.g., 50-100 tortoises/mi^2)

5) Good - Tortoises likely in higher numbers (e.g., more than 100 tortoises/mi^2)

Where a portion of the study area was split between two habitat categories, it is anticipated that tortoise densities approximate the high extreme of the poorer quality habitat designation (e.g., poor-fair habitat probably hosts tortoises in numbers around 10 tortoises/mi^2).

4.0 RESULTS

Milepost 0 (Highway 78) to 1.0 (travelling west) - The proposed pipeline route is in a 230-foot-wide corridor between the 24-foot-wide, maintained dirt road and the single-track railroad. The existing Santa Fe Pacific gas pipeline lies parallel to and 60 feet south of the railroad. A double-arm wooden pole power line extends between the pipeline and railroad. Each side of the existing pipeline is denuded and regularly driven. The remainder of the corridor was graded some time ago and is sparsely (less than 5% cover) vegetated by creosote bush (*Larrea tridentata*) with occasional burrobush (*Ambrosia dumosa*), ratany (*Krameria parvifolia*), and palo verde (*Cercidium floridum*). Forget-me-not (*Cryptantha* spp) and spurge (*Euphorbia albomarginata*) are common ephemeral species. The soil is gravelly sand, covered by a 100% gravelly substrate, of which approximately 90% is fine gravel. The topography is generally flat, although dikes built along the north side of the railroad to channel sheet flooding have resulted in distinct, arboreal (palo verde, ironwood [*Olneya tesota*]) washes south of the railroad. South of the dirt road, the habitat is similar to that in the corridor as a result of moderate Off-Highway-Vehicle (OHV) traffic. Disturbance has rendered the corridor and adjacent habitat to the south poor tortoise habitat.

North of the railroad, the habitat is fair and comprises a moderately sparse creosote bush community with burrobush, pencil cholla (*Opuntia ramosissima*), buckhorn cholla (*O. acanthocarpa*) and scattered ocotillo (*Fouquieria splendens*), big galleta (*Hilaria rigida*), brittlebush (*Encelia farinosa*), cheesebush (*Hymenoclea salsola*), desert straw (*Stephanomeria pauciflora*), ironwood, and palo verde (all but the ocotillo occurring mostly in drainages). Ephemerals include the aspect dominants Arabian grass (*Schismus arabicus*) and plantain (*Plantago insularis*), with common forget-me-not, pincushion flower (*Chaenactis* spp), rigid spiny-herb (*Chorizanthe rigida*), primrose (*Camissonia*), and cambess (*Oligomeris linifolia*). The topography is flat, but cut by many drainages about one to ten inches deep. The substrate reflects the flooding and consists of 80% gravel (50% fine); the soil is somewhat gravelly, slightly loamy fine sand.

Milepost 1.0 to 2.0 - This habitat is similar to the previous mile, although the vegetation in the corridor is generally sparser and smaller. OHV traffic is confined to the north side of the road. The area south of the road is designated by the Bureau of Land Management [BLM] as "Closed" to OHV traffic. South of the road are large, nearly barren patches, approximately 600 feet in diameter, of moderately sparse, dying, low (<1 feet tall) creosote bush. Ephemeral vegetation is as above, north of the railroad. (Note: These "barren" areas appear to have experienced bulldozing many years prior.) Approximately 600 feet south of the railroad, the vegetation appears more normal; 0.25 miles south of the railroad, there are small silty sinks at the foot of the dunes where the arboreal washes converge.

Milepost 2.0 to 15.2 - The corridor is the same as in MP 1-2 (i.e., poor tortoise habitat with very sparse to no shrubs except within a few feet of the road). Culverts under the railroad are generally smaller, and the resulting drainages south of the railroad are smaller, with more sheet washing than to the east. As a result of this sheeting, the shrub layer vegetation is more diverse than to the east (same species richness, but more even), although still sparse (<10% cover), and the substrate is more gravelly. (Note: Where the railroad bridges span cement box culverts, the washes to the south remain substantial, with very sparse creosote bush communities between.) Habitat south of the corridor is poor to fair. North of the railroad, the habitat remains essentially the same as to the east (i.e., fair).

Milepost 11.8 to 13.0 - This portion of the route has moderately established desert pavement (mixed small and large gravel with scattered cobbles) that occurs between small arboreal drainages. The underlying soil is silty. The pavement is largely devoid of vegetation, although several small, sandy drainages (a few inches deep) cross the pavement and are vegetated by brittlebush, burrobush, and creosote bush.

Milepost 13.4 - There is an old graveyard south of road. There are approximately 25 graves in this 50-foot-square graveyard. Markers, when present, are wooden.

Milepost 14.4 - The dunes encroach briefly to within 600 feet of the road. Otherwise, the habitat remains essentially the same as to the east.

Milepost 15.0 - A second wooden-pole line (double-arm) and an underground telecommunications cable (MCI) has entered the corridor at some point east and is present here. The corridor between the road and railroad is now narrower, with the existing gas line only 75 feet north of the road. The corridor remains poor habitat.

North of the railroad, the habitat remains fair. The vegetation and drainage type is similar as to the east, although there is less shrub diversity (mostly creosote bush). The substrate is more gravelly (100% gravel cover, with 75% large gravel), with scattered to rilled cobbles.

Milepost 15.2 to 16.2 - Habitat north and south of the corridor is similar to that due east. There are old tamarisk (*Tamarix* sp) rows planted at the southern edges of both the road and the railroad. The corridor itself is non-habitat; i.e., it is highly and recently disturbed and hosts only annuals and occasional palo verde. The pole line over the MCI cable is a single-arm wooden pole beginning at this point. A second set of railroad tracks also begins at this point.

Milepost 16.2 to 18.3 - North of the railroad, the habitat is typically old-disturbed between the dikes and is nearly barren (extremely sparse creosote bush, ironwood, and palo verde). This is probably a response to the disturbance plus the silty, sink-like nature of the soil typical of habitat adjacent to dunes. Approximately 450 feet north of the railroad, the habitat is similar to that to the east, but is a little less gravelly. (While the substrate still consists of a 100% gravel cover, the large gravel is mostly confined to rills.) The vegetation is mostly a moderately sparse (10% cover) creosote bush-burrobush community. This habitat is low-end fair. South of the railroad, the habitat is poor. The corridor itself is probably non-habitat.

Milepost 16.2 - The toe of the dunes is crossed by the road. (The dunes adjacent to the road are somewhat stabilized by scattered and sparse creosote bush, occasional palo verde, and dense annuals [Arabian grass, plantain, and forget-me-not].) The corridor is further narrowed - the existing pipeline is only 33 feet from the road.

Milepost 18.3 to 18.5 - At Milepost 18.3, the tamarisk windbreak ends at a large, sandy wash (Mammoth Wash). The habitat quality both north and south of the railroad is fair. South of the railroad, the shrub community is a medium density

(15% cover) burrobush community with creosote bush and Mormon Tea (*Ephedra trifurca*). The soil is soft, coarse sand, covered by a fine-gravelly substrate. The topography is flat and characterized by sheet flow, with occasional distinct drainages vegetated by ironwood and palo verde. North of the railroad the habitat is lusher (same species as to the south but denser and more even); the soil is loose-sandy with a 40% cover of fine gravel.

The corridor between the road and the railroad is nearly all annual vegetation and is poor tortoise habitat. The MCI cable and associated wooden-pole line no longer run in the corridor and the gas line is 92 feet from the road.

Milepost 18.5 to 22.5 - The habitat south of the road becomes more like that north of the railroad, although it remains slightly less dense and more gravelly.

Milepost 22.5 - The aqueduct crosses the corridor at this point and there is a citrus orchard south of aqueduct. The only native habitat is moderately dense allscale (*Atriplex polycarpa*) and creosote bush.

Milepost 22.8 - This milepost is at the whistlestop "Iris." This area is fair tortoise habitat dominated by a medium density (20-25% cover) creosote bush-burrobush-allscale community. The soil is loose coarse sand, and the substrate is scattered fine and very fine gravel. The ephemeral vegetation appears to be dominated by Arabian grass. The corridor itself is poor habitat and is almost entirely Arabian grass. At this point, the road is 43 feet from the gas line; there is still only one power line in the corridor. A second line crosses about 600 feet east of "Iris."

Milepost 22.9 to 24.1 - The corridor traverses a tamarisk-arroweed (*Pluchea sericea*) slough (non-habitat).

Milepost 24.1 to 25.1 - This is fair habitat characterized by a medium density to moderately sparse creosote bush-burrobush-*Atriplex* spp community. The corridor is poorly vegetated and is poor tortoise habitat.

Milepost 25.1 to 25.9 - There is a slough on the south side of the road. Immediately north of the railroad is moderate tortoise habitat. It is undulating, dominated by creosote bush and burrobush with common Mormon tea and big galleta (washes) and has a substrate of 60% gravel over sand.

Milepost 25.9 to 27.1 - South of the railroad is previously-disturbed habitat, currently dominated by a sparsely vegetated creosote bush-burrobush-saltbush (*Atriplex canescens*) community. North of the railroad is similar. Further north is agriculture. Both the corridor and surrounding habitat are poor (questionable) tortoise habitat because of the inherent habitat quality, the disturbance level, and the segregation resulting from the agriculture.

Milepost 26.3 - A high-voltage transmission line crosses the corridor.

Milepost 27.2 ("Flowing Wells") to 32.1 (Niland) - This section is non-habitat for tortoises by virtue of agricultural disturbance and poor native habitat. At Flowing Wells, there is agriculture south of the corridor. The corridor now contains the gas pipeline, as well as three wooden-pole lines (two south of the railroad and a double-pole line north of the railroad), and a drainage ditch (agricultural canal). The habitat north of the railroad is mostly cleared, and a levee further north prevents tortoises from reaching the railroad.

Milepost 27.6 - The land south of the road is bladed and devoid of vegetation. North of railroad, the habitat is the same as that to the east.

Milepost 28.3 - The land south of the road is recently tilled. North of railroad is as to the east.

Milepost 29.8 - On the south side of road, the habitat is less disturbed than to the east and hosts some native vegetation. North of railroad is a burned slough.

Milepost 30.0 - South of the railroad is a highly disturbed, very sparse creosote bush-*Atriplex* spp-inkweed (*Suaeda* sp) community. North of the road is a small creosote bush-*Atriplex* spp community surrounded by agriculture.

Milepost 30.6 - The larger power line, north of railroad, veers north.

Milepost 30.7 - At this point is a small tamarisk drainage. There is agriculture both north and south of the road, and the hay ranch on the south side has been recently tilled.

Section 3 (Township 11S, Range 14E) - The road veers away from the railroad after crossing over the canal. There is hay farming south of the road and a disturbed creosote bush -*Atriplex* spp community with inkweed between the road and railroad. Mesquite (*Prosopis* sp) borders the road. North of the railroad is very disturbed (industry and housing-associated disturbances) but with some continuous (albeit poor) habitat north of the disturbance.

5.0 CONCLUSIONS

The pipeline route occurs in a narrow, highly disturbed corridor between the railroad and a dirt service road. While tortoise habitat exists on either side of railroad from Flowing Wells east, the pipeline corridor itself is probably uninhabited and provides only foraging or transit sites for local tortoises. East of Flowing Wells, few tortoises would probably be encountered during construction in this corridor irrespective of its current level of disturbance, because (1) habitat on either side of the railroad is largely only of fair quality (i.e. tortoises probably present in low numbers), (2) the railroad probably serves as a mortality sink for adjacent tortoises, and (3) the Algodones Dunes (non-habitat) lie mostly within 0.25 miles south of the corridor for much of this portion of the pipeline route. Hence, the incidental take level for construction of this pipeline is estimated to be very low, probably less than five tortoises. This includes a mortality take of, at most, one tortoise.

Operation of the rail line would similarly impact only a few more tortoises than are already affected by the existing, active rail line because of the low abundance of tortoises for most of the adjacent habitat. While some tortoises might be attracted to the railroad berm because of topographic relief (see Karl 1983 "Biological Assessment for Mesquite Regional Landfill, Desert Tortoise Surveys), this number would be very low because of adjacent low tortoise densities. (This could easily be measured by a minor survey prior to estimating an incidental take for the life of the railroad.) An even smaller number of tortoises would die as a result of exposure between the rails (also easily measured in the same survey). It is not anticipated that noise levels would exceed those currently experienced by desert tortoises and other wildlife living near the railroad.

Because of the prior and ongoing disturbance within the corridor, there is no basis for compensation of habitat disturbed during pipeline construction. It would be advisable, however, to avoid tortoise mortalities during construction by using a monitor whose sole purpose is to seek and remove tortoises that could be in danger. Such tortoises would be handled using state-of-the-art techniques and removed to artificial burrows or shaded sites (depending upon the season and ambient temperatures) 400 yards from the construction zone. Such tortoises would be monitored to guard against re-entry into the construction zone. If necessary, they would be held, or the construction area fenced, until construction was completed.

MESQUITE REGIONAL LANDFILL EIS/EIR

APPENDIX D-6

BIOLOGICAL RESOURCES TABLES

JANUARY 1994

TABLE 1

Special Interest Species Expected to Occur in the Vicinity of the Proposed Landfill Project Site

Proposed Mesquite Regional Landfill

SPECIES	STATUS				
	FWS	BLM	CDFG	NDDB	CNPS
Reptiles					
Gopherus agassizii, Desert tortoise*	T	S	T	X	--
Amphibians					
Scaphiopus couchii, Couch's spadefoot toad*	C2	S	CSC	X	--
Birds					
Buteo regalis, Ferruginous hawk*	C2	S	CSC	X	--
Dendroica petechia sonorana, Sonoran yellow warbler*	--	--	CSC	X	--
Junco hyemalis caniceps, California gray-headed junco*	--	--	CSC	X	--
Pandion haliaetus, Osprey	--	--	CSC	X	--
Polioptila melanura, Black-tailed gnatcatcher*	--	--	CSC	X	--
Toxostoma bendirei, Bendire's thrasher*	--	--	CSC	X	--
T. lencontei, Le Conte's thrasher	--	--	CSC	X	--
Vermivora virginiae, Virginia's warbler*	--	--	CSC	X	--
Mammals					
Macrotus californicus, California leaf-nosed bat	C2	S	CSC	X	--
Neotoma albigula venusta, Colorado Valley woodrat*	--	--	--	X	--
Odocoileus hemionus, Mule deer*	--	--	G	--	--
Ovis canadensis nelsoni, Nelson's bighorn sheep*	--	--	--	X	--
Taxidea taxus, American badger	--	--	CSC	X	--
Plants					
Calliandra eriophylla, Fairy duster*	--	S	--	X	L2
Cryptantha costata, Ribbed cryptantha*	--	--	--	X	L4

Notes: (See last page of Table 2)

Source: University of Arizona Office of Arid Land Studies, 1992.

TABLE 2

Special Interest Species Expected to Occur in the Vicinity of the Southern Pacific Main Line Right-of-Way

Proposed Mesquite Regional Landfill

SPECIES	STATUS				
	FWS	BLM	CDFG	NDDB	CNPS
Reptiles					
Anniella pulchra pulchra, Silvery legless lizard	--	--	CSC	X	--
Charina bottae umbratica, Southern rubber boa	C2	S	CT	X	--
Cnemidophrus hyperythrus, Orange-throated whiptail	C2	S	CSC	X	--
Crotalus ruber, Red diamond rattlesnake	C2	--	CSC	X	--
Gopherus agassizii, Desert tortoise	T	S	CT	X	--
Phrynosoma coronatum blainvillei, San Diego horned lizard	C2	S	CSC	X	--
P. m'calli, Flat-tailed horned lizard	C1	S	CSC	X	--
Uma inorata, Coachella Valley fringe-toed lizard	T	S	CE	X	--
U. notata notata, Colorado Desert fringe-toed lizard	C2	S	CSC	X	--
Amphibians					
Rana pipiens, Leopard frog	--	--	CSC	X	--
R. aurora draytonii, California red-legged frog	C1	S	CSC	X	--
R. yavapaiensis, *Yavapai* (lowland) leopard frog	C2	S	--	X	--
Scaphiopus couchii, Couch's spadefoot toad	C2	S	CSC	X	--
Fish					
Cyprinodon macularius, Desert pupfish	E	S	CE	X	--
Xyrauchen texanus, Razorback sucker	E	S	CE	X	--
Birds					
Accipiter cooperii, Cooper's hawk (B)	--	--	CSC	X	--
A. striatus, Sharp-shinned hawk (B)	--	--	CSC	X	--
Aechmophorus occidentalis, Western grebe ∞	--	--	--	X	--
Aquila chrysaetos, Golden eagle (B, W)	--	--	CSC	X	--
Ardea herodias, Great blue heron ∞ (Rs)	--	--	--	X	--
Asio flammeus, Short-eared owl (B)	--	--	CSC	X	--
A. otus, Long-eared owl	--	--	CSC	X	--
Athene cunicularia, Burrowing owl (Bs)	--	--	CSC	X	--
Bucephala albeola, Bufflehead ∞ (B)	--	--	--	X	--
Buteo regalis, Ferruginous hawk (W)	C2	S	CSC	X	--
B. swainsoni, Swainson's hawk (B)	--	--	CT	X	--
Casmerodius albus, Great egret ∞ (Rs)	--	--	--	X	--
Charadrius alexandrinus nivosus, Western snowy plover (B)	T	S	CSC	X	--
C. montanus, Mountain plover (W)	C2	S	CSC	X	--
Circus cyanus, Northern harrier (B)	--	--	CSC	X	--
Colaptes auratus chrysoides, Gilded northern flicker	--	--	CE	X	--
Dendrocygna bicolor, Fulvous whistling duck (B)	C2	S	CSC	X	--
Dendroica petechia brewsteri, Yellow warbler (B)	--	--	CSC	X	--
D.p. sonorana (possible), Sonoran yellow warbler (B)	--	--	CSC	X	--
Egretta thula, Snowy egret ∞ (Rs)	--	--	--	X	--
Elanus caeruleus, Black-shouldered kite ∞ (B)	--	--	--	X	--
Empidonax traillii, Willow flycatcher (B)	--	S	CE	X	--

Source: University of Arizona Office of Arid Land Studies, 1992.
Notes are shown on last page of Table.

TABLE 2
(Continued)

SPECIES	STATUS				
	FWS	BLM	CDFG	NDDB	CNPS
Birds (continued)					
Falco columbarius, Merlin	--	--	CSC	X	--
F. mexicanus, Prairie falcon (B)	--	--	CSC	X	--
F. peregrinus anatum, American peregrine falcon	E	S	CE	X	--
Gavia immer, Common loon (B)	--	--	CSC	X	--
Geothlypis trichas sinuosa, Saltmarsh common yellowthroat	C2	S	--	X	--
Haliaeetus leucocephalus, Bald eagle (BW)	E	S	CE	X	--
Icteria virens, Yellow-breasted chat (B)	--	--	CSC	X	--
Ixobrychus exilis, Least bittern (Rs)	--	--	CSC	X	--
Larus atricilla, Laughing gull (Nc)	--	--	CSC	X	--
L. californicus, California gull (Nc)	--	--	CSC	X	--
Laterallus jamaicensis corturniculus, California black rail	C1	S	CT	X	--
Melanerpes uropygialis, Gila woodpecker	--	--	CE	X	--
Mycteria americana, Wood stork	--	--	CSC	X	--
Numenius americanus, Long-billed curlew (B)	--	S	CSC	X	--
Nyciticorax nyciticorax, Black-crowned night heron ∞ (Rs)	--	--	--	X	--
Pandion haliaetus, Osprey (B)	--	--	CSC	X	--
Pelecanus erythrorhynchos, American white pelican (Nc)	--	--	CSC	X	--
P. occidentalis californicus, California brown pelican (Nc)	E	S	CE	X	--
Phalacrocorax auritus, Double-crested cormorant (Rs)	--	--	CSC	X	--
Polioptila californica, California gnatcatcher	T	S	CSC	X	--
P. melanura, Black-tailed gnatcatcher	--	--	CSC	X	--
Pyrocephalus rubinus, Vermillion flycatcher (B)	--	--	CSC	X	--
Rallus longirostris yumanensis, Yuma clapper rail	E	S	CT	X	--
Riparia riparia, Bank swallow (Nc)	--	--	CT	X	--
Rynchops niger, Black skimmer (Nc)	--	--	CSC	X	--
Sterna antillarum browni (possible), California least tern (Nc)	E	S	CE	X	--
S. caspia, Caspian tern ∞ (Nc)	--	--	--	X	--
S. forsteri, Forster's tern ∞ (Nc)	--	--	--	X	--
S. nilotica, Gull-billed tern (Nc)	--	--	CSC	X	--
Toxostoma dorsale, Crissal thrasher	--	--	CSC	X	--
T. lecontei, Le Conte's thrasher	--	--	CSC	X	--
Vireo bellii pusillus, Least Bell's vireo (B)	E	S	CE	X	--
Mammals					
Antrozous pallidus, Pallid bat	--	--	CSC	X	--
Dipodomys stephensi, Stephen's kangaroo rat	E	S	CT	X	--
Euderma maculatum, Spotted bat	C2	S	CSC	X	--
Macrotus californicus, California leaf-nosed bat	C2	S	CSC	X	--
Neotoma albigula venusta, Colorado Valley woodrats	--	--	--	X	--
Nyctinomops (=Tadarida) femorosaccus, Pocketed free-tailed bat	--	--	CSC	X	--
N. (=Tadarida) macrotis, Big free-tailed bat	--	--	CSC	X	--
Perognathus longimembris brevinasus, Los Angeles pocket mouse	C2	S	CSC	X	--

Source: University of Arizona Office of Arid Land Studies, 1992.
Notes are shown on last page of Table.

TABLE 2
(Continued)

SPECIES	STATUS				
	FWS	BLM	CDFG	NDDB	CNPS
Mammals (continued)					
Spermophilus tereticaudus chlorus, Palm Springs ground squirrel	C2	S	CSC	X	--
Taxidea taxus, American badger	--	--	CSC	X	--
Plants					
Allium fimbriatum var. *munzii,* Munz's onion	C1	S	CT	X	L1B
Astragalus insularis var. *harwoodii,* Harwood's milk vetch	--	--	--	X	L2
A. lentiginosus var. *borreganus,* Borrego milk vetch	--	--	--	X	L4
A. l.var. coachellae, Coachella Valley milk vetch	C1	S	--	X	L1B
A. magdalenae var. *peirsonii,* Peirson's milk vetch	C2	S	CE	X	L1B
A. tricarinatus, Triple-ribbed milk vetch	C2	S	--	X	L1B
Ayenia compacta, Ayenia	--	--	--	X	L2
Brodiaea orcutti, Orcutt's brodiaea	C2	S	--	X	L1B
Calliandra eriophylla, Fairy duster	--	--	--	X	L2
Calochortus plummerae (new addition), Mariposa lily	C2	S	--	X	L1B
Cassia covesii, Cove's cassia	--	--	--	X	L2
Caulanthus simulans, Payson's jewelflower	C2	S	--	X	L4
Chamaesyce platysperma, Flat-seeded spurge	C2	S	--	X	L3
Chorizanthe fimbriata var. *laciniata* (new)	--	--	--	--	L4
C. leptotheca (new)	--	--	--	--	L4
C. parryi var. *parryi,* Parry's spineflower	C2	S	--	X	--
C. polygonoides longispina (new)	--	--	--	--	L1B
Coryphantha vivipera var. *alversonii,* Foxtail cactus	C2	S	--	--	L1B
Croton wigginsii, Wiggin's croton	C3c	--	CR	X	L2
Cryptantha costata, Ribbed cryptantha	--	--	--	X	L4
C. ganderi, Gander's cryptantha	C2	S	--	X	L1B
C. holoptera, Winged cryptantha	--	--	--	X	L4
Cynanchum utahense, Utah cynanchum	--	--	--	X	L4
Ditaxis adenophora, Glandular ditaxis	--	--	--	X	L2
D. californica, California ditaxis	C2	S	--	X	L1B
Dodecahema leptoceras, Slender-horned spineflower	E	S	CE	X	L1B
Eriastrum densifolium ssp. *sanctorum,* Santa Ana river woollystar	E	S	CE	X	L1B
Eucnide rupestris, Rock nettle	--	--	--	X	L2
Ferocactus acanthodes var. *acanthodes,* California barrel cactus	C2	S	--	--	L3
Galium californicum ssp. *primum,* California bedstraw	C2	S	--	X	L1B
Gilia maculata, Little San Bernardino Mountains gilia	C2	S	--	X	L1B
Hemizonia laevis, Smooth tarplant	--	--	--	X	L3
H. mohavensis, Mojave tarplant	C1	S	CE	X	L1A
Koeberlinia spinosa, Crown-of-thorns	--	--	--	X	L2
Larrea tridentata var. *arenaria,* Algodones creosote bush	--	--	--	--	L3
Lycium parishii, Parish's desert thorn	--	--	--	X	L2
Mahonia nevinii, Nevin's barberry	C1	S	CE	X	L1B

Source: University of Arizona Office of Arid Land Studies, 1992.
Notes are shown on last page of Table.

TABLE 2
(Continued)

SPECIES	STATUS				
	FWS	BLM	CDFG	NDDB	CNPS
Plants (continued)					
Malacothamnus parishii, Parish's bush mallow	C2	S	--	X	L1B
Marina orcuttii var. *orcuttii,* California marina	C2	S	--	X	L1B
Matelea parvifolia, Spearleaf	--	--	--	X	L2
Mirabilis tenuiloba, Long-lobed four-o'clock	--	--	--	X	L4
Monardella pringlei, Pringle's monardella	C1	S	--	X	L1A
Opuntia munzii, Munz's cactus	C2	S	--	X	L1B
O. wigginsii, Wiggin's cholla	C2	S	--	X	L1B
Palafoxia arida var. *gigantea,* Giant Spanish-needle	C3c	--	--	X	L1B
Penstemon clevelandii ssp. *connatus,* San Jacinto beardtongue	--	--	--	X	L4
P. thurberi, Thurber's beardtongue	--	--	--	. X	L3
Phaseolus filiformis (*P. wrightii*), Wright's phaseolus	--	--	--	X	L3
Pholisma sonorae, Sand food	C2	S	--	X	L1B
Pilostyles thurberi, Thurber's pilostyles	C3c	--	--	X	L4
Portulaca halimoides (*P. mundula*), Desert portulaca	--	--	--	X	L3
Ribes divaricatum var. *parishii,* Parish's gooseberry	C2	S	--	X	L1B
Rorippa gambellii, Gambel's water cress	C1	S	CT	X	L1B
Salvia greatai, Orocopia sage	C2	S	--	X	L1B
Selaginella eremophila (new)	--	--	--	--	L3
Xylorhiza cognata, Mecca aster	C3c	--	--	X	L4
X. orcuttii, Orcutt's woody aster	C2	S	--	X	L1B

Source: University of Arizona Office of Arid Land Studies, 1992.
Notes are shown on last page of Table.

TABLE 2

Special Interest Species Expected to Occur in the Vicinity of the Southern Pacific Main Line Right-of-Way

Proposed Mesquite Regional Landfill (Continued)

Notes:

FWS	=	U.S. Fish and Wildlife Service.
BLM	=	U.S. Bureau of Land Management.
CDFG	=	California Department of Fish and Game.
CNPS	=	California Native Plant Society.
NDDB	=	Natural Diversity Database.
X	=	Listed on NDDB.
T	=	Federally listed, threatened species.
E	=	Federally listed, endangered species.
PE	=	Proposed endangered species.
C1	=	Federal Category 1 species. Enough data are on file to support the federal listing.
C2	=	Federal Category 2 candidate species for federal listing as threatened or endangered. Data are insufficient at this time to support listing.
C3c	=	Data are insufficient at this time to support listing.
S	=	Federal (FWS and BLM) sensitive species.
CR	=	California (CDFG) rare species
CSC	=	California (CDFG) species of special concern.
CT	=	California (CDFG) threatened species.
CE	=	California (CDFG) endangered species.
L1A	=	CNPS List 1A: A list of plants presumed extinct in California.
L1B	=	CNPS List 1B: A list of plants that are rare, threatened or endangered in California, but are more common elsewhere. Plants on this list likely meet the biological criteria for consideration under CEQA.
L2	=	CNPS List 2: Plants that are rare, threatened, or endangered in California, but more common elsewhere. These plants are eligible for state listing.
L3	=	CNPS List 3: A review of species about which more information is needed.
L4	=	CNPS 4: A "watch list" of plants of limited distribution.
W	=	Wintering.
B	=	Breeding.
Rs	=	Rookery site.
Nc	=	Nesting colony.
∞	=	1) Taxa that are rare, restricted, or declining throughout their range; (2) population(s) in California that are threatened; or 3) taxa closely associated with rapidly declining habitats in California.
*	=	Observed on or in the vicinity.
--	=	No listing.

Source: University of Arizona Office of Arid Land Studies, 1992.

TABLE 3

Special Interest Species Expected to Occur in the Vicinity of the Exchange Properties in the SRMNSA

Proposed Mesquite Regional Landfill

SPECIES	STATUS				
	FWS	BLM	CDFG	NDDB	CNPS
Reptiles					
Crotalus ruber ruber, Northern red diamond rattlesnake	C2	S	CSC	X	--
Sauromalus obesus, Common chuckwalla	C2	S	--	X	--
Birds					
Aquila chrysaetos, Golden eagle	--	--	CSC	X	--
Falco mexicanus, Prairie falcon	--	--	CSC	X	--
Lanius ludovicianus, Loggerhead shrike	C2	S	--	X	--
Polioptrila melanura, Black-tailed gnatcatcher	--	--	CSC	X	--
Mammals					
Antrozous pallidus, Pallid bat	--	--	CSC	X	--
Euderma maculatum, Spotted bat	C2	S	CSC	X	--
Macrotus californicus, California leaf-nosed bat	C2	S	CSC	X	--
Neotoma albigula venusta, Colorado Valley woodrat∞	--	--	--	X	--
Nyctinomops (=Tadarida) femorosaccus, Pocketed free-tailed bat	--	--	CSC	X	--
Ovis canadensis cremnobates, Peninsular bighorn sheep	PE	S	CT	X	--
Plecotus townsendii townsendii, Townsend's western big-eared bat	C2	S	CSC	X	--
Plants					
Allium fimbriatum var. *munz,* Munz's onion	C1	S	CT	X	L1B
Ammoselinum giganteum, Desert sand parsley	--	--	--	X	L2
Antirrhinum cyathiferum, Deep canyon snapdragon	--	--	--	X	L2
Astragalus nutans, Providence Mtn. milk vetch	--	--	--	X	L4
Astragalus tricarinatus, Triple-ribbed milk vetch	C2	S	--	X	L1B
Ayenia compacta, Ayenia	--	--	--	X	L2
Cassia covesii, Cove's cassia	--	--	--	X	L2
Castela emoryi, Crucifixion thorn	--	--	--	X	L2
Chamaesyce arizonica, Arizona spurge	--	--	--	X	L2
Colubrina californica, Las Animas colubrina	C3c	--	--	X	L4
Coryphantha vivipara var. *alversonii,* Foxtail cactus	C2	S	--	X	L1B
Cryptantha costata, Ribbed cryptantha	--	--	--	X	L4
Cryptantha holoptera, Winged cryptantha	--	--	--	X	L4
Cynanchum utahense, Utah cynanchum	--	--	--	X	L4
Ditaxis californica, California ditaxis	C2	S	--	X	L1B
Ferocactus acanthodes var. *acanthodes,* California barrel cactus*	C2	S	--	--	L3

Source: Western Ecological Services Company, Inc., 1992

TABLE 3
(Continued)

SPECIES	STATUS				
	FWS	BLM	CDFG	NDDB	CNPS
Plants (continued)					
Gilia maculata, Little San Bernardino Mtns. gilia	C2	S--	--	X	L1B
Lycium parishii, Parish's desert-thorn	--	S	--	X	L2
Malacothamnus parishii, Parish's bush mallow	C2	S	--	X	L1B
Opuntia munzii, Munz' cactus	C2	S	--	X	L1B
Opuntia wigginsii, Wiggin's cholla	C2	--	--	X	L1B
Penstemon thuberi, Thurber's beardtongue	--	--	--	X	L3
Phaseolus filiformis (P. wrightii), Wright's phaseolus	--	--	--	X	L3
Pilostyles thurberi, Thurber's pilostyles	C3c	--	--	X	L4
Proboscidea althaeifolia, Desert unicorn plant	--	--	--	X	L4
Salvia eremostachya, Desert sage	C3c	--	--	X	L4
Xylorhiza cagnata, Mecca aster	C3c		--	X	L4

Notes:
FWS = U.S. Fish and Wildlife Service.
BLM = U.S. Bureau of Land Management.
CDFG = California Department of Fish and Game.
CNPS = California Native Plant Society.
NDDB = CDFG Natural Diversity Data Base.
CT = California Threatened Species.
CE = California Endangered Species
L1B = CNPS List 1B: A list of plants that are rare, threatened, or endangered in California and elsewhere. Plants on this list likely meet the biological criteria requiring them to be considered under CEQA.
L2 = CNPS List 2: Plants that are rare, threatened, or endangered in California, but more common elsewhere. These plants are eligible for state listing.
L3 = CNPS List 3: A review of species about which more information is needed.
L4 = CNPS List 4: A "watch list" of plants of limited distribution.
C1 = Category 1 candidate for federal listing as threatened or endangered (enough data are on file to support the federal listing).
C2 = Category 2 candidate for federal listing as threatened or endangered (data are insufficient at this time to support listing).
C3c = Category 3 non-candidate for federal listing as threatened or endangered (data are insufficient at this time to support listing).
S = Federal (FWS and BLM) Sensitive Species.
CSC = California Species of Special Concern.
* = Observed on or in the vicinity of Exchange Properties.
– = No listing.
∞ = 1) Taxa that are rare, restricted, or declining throughout their range; 2) population(s) in California which are threatened; or 3) taxa closely associated with rapidly declining habitats.
PE = Proposed Endangered Species.
X = Listed in the NDDB.

Source: Western Ecological Services Company, Inc., 1992

TABLE 4

Special Interest Species Expected to Occur in the Vicinity of the Exchange Properties Near the Chuckwalla Bench

Proposed Mesquite Regional Landfill

SPECIES	STATUS				
	FWS	BLM	CDFG	NDDB	CNPS
Reptiles					
Gopherus agassizii, Desert tortoise*	T	S	CT	X	--
Sauromalus obesus, Common chuckwalla*	C2	S	--	X	--
Amphibians					
Scaphiopus couchii, Couch's spadefoot toad	C2	S	CSC	X	--
Birds					
Aquila chrysaetos, Golden eagle	--	--	CSC	X	--
Athene cunicularia, Burrowing owl	--	--	CSC	X	--
Buteo regalis, Ferruginous hawk	C2	S	CSC	X	--
Falco mexicanus, Prairie falcon	--	--	CSC	X	--
Lanius ludovicianus, Loggerhead shrike*	C2	S	CSC	X	--
Melanerpes uropygialis, Gila woodpecker	--	--	CE	X	--
Polioptila melanura, Black-tailed gnatcatcher	--	--	CSC	X	--
Toxostoma dorsale, Crissal thrasher	--	--	CSC	X	--
Toxostoma lencontei, Le Conte's thrasher	--	--	CSC	X	--
Mammals					
Antrozous pallidus, Pallid bat	--	--	CSC	X	--
Euderma maculatum, Spotted bat	C2	S	CSC	X	--
Macrotus californicus, California leaf-nosed bat	C2	S	CSC	X	--
Myotis velifer, Cave myotis	C2	--	CSC	X	--
Neotoma albigula venusta, Colorado Valley woodrat ∞	--	--	--	X	--
Nyctinomops (=Tadarida) femorosaccus, Pocketed free-tailed bat	--	--	CSC	X	--
Plecotus townsendii townsendii, Townsend's western big-eared bat	C2	S	CSC	X	--
Plants					
Astragalus crotalariae, Salton milk vetch	--	--	--	X	L4
A. lentiginosus var. *borreganus*, Borrego milk vetch	--	--	--	X	L4
Calliandra eriophylla, Fairy duster*	--	--	--	X	L2
Cassia covesii, Cove's cassia	--	--	--	X	L2
Castela emoryi, Crucifixion thorn	--	--	--	X	L2
Chamaesyce arizonica, Arizona spurge	--	--	--	X	L2
Colubrina californica, Las Animas colubrina	C3c	--	--	X	L4
Cryptantha costata, Ribbed cryptantha	--	--	--	X	L4
C. holoptera, Winged cryptantha	--	--	--	X	L4
Cynanchum utahense, Utah cynanchum	--	--	--	X	L4

Source: Western Ecological Services Company, Inc., 1992.

TABLE 4
(Continued)

SPECIES	STATUS				
	FWS	BLM	CDFG	NDDB	CNPS
Plants (continued)					
Delphinium parishii ssp. *subglobosum,* Parish's larkspur	--	--	--	--	L4
Eucnide rupestris, Rock nettle	--	--	--	X	L2
Ferocactus acanthodes var. *acanthodes,* California barrel cactus*	C2	S	--	--	L3
Ipomopsis effusa, Baja California ipomopsis	--	--	--	X	L2
I. tenuifolia, Slender-leaved ipomopsis	--	S	--	X	L2
Koeberlinia spinosa, Crown-of-thorns	--	--	--	X	L2
Lycium parishii, Parish's desert-thorn	--	--	--	X	L2
Lyrocarpa coulteri var. *palmeri,* Coulter's lyrepod	--	--	--	X	L4
Malperia tenuis, Brown turbans	--	--	--	X	L2
Mentzelia hirsutissima var. *stenophylla,* Hairy stickleaf	C3c	--	--	X	L2
Mirabilis tenuiloba, Long-lobed four-o'-clock	--	--	--	X	L4
Opuntia munzii, Munz' cactus	C2	S	--	X	L1B
Opuntia wigginsii, Wiggin's cholla	C2	S	--	X	L1B
Penstemon thuberi, Thurber's beardtongue	--	--	--	X	L3
Pholisma sonorae, Sand food	C2	S	--	X	L1B
Pilostyles thurberi, Thurber's pilostyles	C3c	--	--	X	L4
Proboscidea althaeifolia, Desert unicorn plant	--	--	--	X	L4
Salvia greatai, Orocopia sage	C2	S	--	X	L1B
Xylorhiza orcutii, Orcutt's woody aster	C2	S	--	X	L1B

Notes:
FWS = U.S. Fish and Wildlife Service
T = Threatened
E = Federally listed, endangered species
BLM = U.S. Bureau of Land Management.
S = Sensitive Species.
CDFG = California Department of Fish and Game
CNPS = California Native Plant Society
NDDB = CDFG Natural Diversity Data Base
L1B = CNPS List 1B: A list of plants that are rare, threatened, or endangered in California and elsewhere. Plants on this list likely meet the biological criteria requiring them to be considered under CEQA.
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CSC = California Species of Special Concern
CT = Threatened
X = Listed in the NDDB
* = Observed on or in the vicinity of Exchange Properties.
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