Photos taken in vicinity of
Pilot Knob Mesa

Chapter 3
Affected Environment

CHAPTER 3.0
AFFECTED ENVIRONMENT

This chapter presents a description of the affected environment for the Plan Area and vicinity. It is organized into the following resource categories:

- Recreation (Section 3.1)
- Biological Resources (Section 3.2)
- Law Enforcement and Public Safety (Section 3.3)
- Socioeconomics (Section 3.4)
- Land Use and Land Ownership (Section 3.5)
- Visual Resources (Section 3.6)
- Water Resources (Section 3.7)
- Cultural Resources (Section 3.8)
- Transportation and Traffic (Section 3.9)
- Noise (Section 3.10)
- Air Quality (Section 3.11)
- Hazardous Materials (Section 3.12)
- Geology, Energy, and Mineral Resources (Section 3.13)

For the purpose of preparing the analysis provided in Chapter 4 of this DEIS, the baseline affected environment is defined as those conditions that existed prior to implementation of the temporary OHV and camping closures, referred to as "Current Conditions" (see Section 1.3.5 and Figure 1-3). The last full recreation season at ISDRA in which these conditions occurred was October 1, 1999, to September 30, 2000. During this time period, management activities at ISDRA were conducted in accordance with the 1987 RAMP.

The Imperial Sand Dune system is divided into three main areas. The northernmost area is known as Mammoth Wash. South of Mammoth Wash and north of SR-78 is the North Algodones Dunes Wilderness, a 32,240-acre preserve established by the 1994 CDPA. This area is closed permanently to OHVs and other mechanized use, with hiking and horseback access permitted. The largest and most heavily used OHV area is located south of SR-78, and continues south past I-8.

Areas within the ISDRA currently designated for OHV use by the CDCA Plan and the 1987 RAMP include:

- That portion of Mammoth Wash located north of the North Algodones Dunes Wilderness
- The Glamis/Gecko area, located just south of SR-78
- Dune Buggy Flats and Ogilby located in the southern portion of ISDRA
- Buttercup, located south of I-8, near the border of Mexico

The following sections provide further detail on the baseline conditions at ISDRA, based on 13 distinct but interrelated resource categories.

3.1 RECREATIONAL RESOURCES

3.1.1 Introduction

The ISDRA is a highly valued and unique recreation resource within the southwestern United States for two reasons: (1) it is a sand dune ecosystem of a size and height that are unparalleled, and (2) it fills a unique and valued niche for providing the largest acreage of semi-primitive OHV recreation opportunities in the United States. The ISDRA has far more acreage than the 10 other dune areas[1] that are located within 1,500 miles.

Recreation resources within the ISDRA are managed to provide safe and enjoyable "recreation opportunities" to the public. A recreation opportunity is commonly defined as the opportunity for a person to participate in a particular activity in a specific setting to attain a preferred type of experience and subsequent benefits.

The ISDRA is managed to provide both non-motorized and motorized recreational opportunities to area residents and visitors. The motorized recreational use is in the form of OHV use. The OHV use encompasses many types of desired motorized recreation opportunities, such as all-terrain vehicles (ATVs), dune buggies, and dirt bikes.

In addition to OHV use, the ISDRA provides other recreational opportunities including hiking, horseback riding, wildlife and scenery viewing, picnicking, photography, nature study and environmental education, camping, sightseeing, and driving for pleasure.

Provided below is a discussion of the regulatory framework of the BLM and a description of the recreation resources of the ISDRA.

3.1.2 Regulatory Framework

3.1.2.1 California Desert Conservation Act Plan of 1980

Since its designation, the ISDRA has been managed according to mandates set forth in both the 1980 CDCA and 1976 FLPMA. Among FLPMA's requirements is:

> *…the use of all California desert resources can and should be provided for in a multiple use and sustained yield management plan to conserve these resources for future generations, and to provide present and future use and enjoyment, particularly outdoor recreation uses, including the use, where appropriate, of off-road recreational vehicles…* [Title VI. SC1781. Sec. 601 (a)(4)].

The CDCA Plan of 1980, as amended provides overall management direction for all public lands in the CDCA. The CDCA Plan's Recreation Element lists several goals, as follows:

- Provide for a wide range of quality recreation opportunities and experiences emphasizing dispersed undeveloped use.

[1] The 10 dune areas referred to are located in California, Arizona, Nevada, and Utah.

- Provide a minimum of recreation facilities. Those facilities should emphasize resource protection and visitor safety.
- Manage recreation use to minimize user conflicts, provide a safe recreation environment, and protect desert resources.
- Emphasize the use of public information and education techniques to increase public awareness, enjoyment, and sensitivity to desert resources.
- Adjust management approach to accommodate changing visitor use patterns and preferences.
- Adjust management approach to accommodate changing visitor use patterns and preferences.
- Encourage the use and enjoyment of desert recreation opportunities by special populations, and provide facilities to meet the needs of those groups (BLM, 1980).

To manage the desert resources, the CDCA Plan divided the ISDRA into Multiple-Use Classes that stipulate whether different areas could be used recreationally and the intensity of that use. Because these classes are legally binding, unless amended through the public process, the BLM must manage the ISDRA according to the class prescriptions. The Multiple-Use Classes assigned to the ISDRA are as follows (Figure 3.1-1):

- Multiple-Use Class I – "Intensive Use": Its purpose is to provide for concentrated use of land and resources to meet human needs. Reasonable protection will be provided for sensitive natural and cultural values. Mitigation of impacts on resources will be implemented, and rehabilitation of impacted areas will occur, if possible. Recreation activities involving high densities are permitted. Campgrounds and other facilities are permitted. Lands assigned to Class I incorporate OHV areas within the ISDRA designated as "open." These areas include: the majority of the Mammoth Wash area, the Glamis/Gecko area, the Dune Buggy Flats area, and the Buttercup area. The management objective of these areas is to enhance opportunities for OHV recreation.
- Multiple-Use Class M – "Moderate Use": Based upon a controlled balance between higher intensity use and protection of public lands. This class provides for a wide variety of present and future uses such as mining, livestock grazing, recreation, energy, and utility development. This class is also designed to conserve desert resources and to mitigate damage to those resources that permitted uses may cause. Recreational use is appropriate at moderate to high densities, and developed recreation sites are permitted. Lands assigned to Class M incorporate OHV areas within the ISDRA designated as "limited." However, identifying individual vehicle routes within sand dunes is impractical; therefore, areas assigned Class M generally are designated as "open" or "closed." The exception is the South Ogilby Dunes area (classified M), which is designated as "limited to

existing routes." East Mesa south of SR-78, the area east of Glamis, and South Ogilby Dunes were placed in Class M.

- Multiple-Use Class L – "Limited Use": This class protects sensitive, natural, scenic, ecological, and cultural resource values. These lands are managed to provide for generally lower intensity, carefully controlled multiple use of resources, while ensuring that sensitive values are not significantly diminished. The South Algodones Dunes, formerly WSA 362, preliminarily was designated Class C, but since has been removed from consideration and is now designated Class L. The CDCA assigned much of the central dunes and Pilot Knob Mesa to this class to protect sensitive plant and wildlife habitat. East Mesa north of SR-78 also was placed in Class L. This class is suitable for recreation that generally involves low- to moderate-user densities. Developed campgrounds or sites involving concentrated recreational use generally are not allowed in this class. Lands assigned to Class L incorporate OHV areas within the ISDRA designated as "limited." However, identifying individual vehicle routes within sand dunes is impractical; therefore, areas assigned Class L generally are designated as "open" or "closed." The exception is the Pilot Knob Mesa (not a sand dune area – classified L), which is designated as "open." The OHV areas within the ISDRA classified as Class L and designated "open" include the Central Dunes area south of the Glamis/Gecko area, including former WSA 362 and the Ogilby Campsite area. OHV use in the Central Dunes area traditionally has been limited to access between the Glamis/Gecko and Buttercup areas (Class I areas) on the sand highway, and has occurred at low levels. The Central Dunes area was designated "open" to provide for OHV access between these two intensively used areas. To limit use of this movement corridor, the BLM decided not to improve the area to allow for two-wheel drive access or additional campgrounds.

- Multiple-Use Class C – "Controlled Use": There are two purposes to this class: it shows areas that are being "preliminarily recommended" as suitable for wilderness designation by Congress and it shows those areas formally designated as wilderness by Congress. The North Algodones Sand Dunes Wilderness was designated wilderness in the CDCA Plan through the California Desert Protection Act of 1994.

As previously discussed, areas within the ISDRA are currently designated for OHV use by the CDCA Plan and the 1987 RAMP. Lands classified as Class L or M generally are designated as "Limited" for OHV use under the CDCA. However, within sand dune areas, lands are designated either "Open" or "Closed" regardless of MUCs. This is because the topographic or other land characteristics that make management of limited use areas practical generally do not exist on open dune fields. Exceptions to the avoidance of limited use designations in the Plan Area include the dunes at South Ogilby, which are "Limited to Existing Routes," and Pilot Knob Mesa (not a dune area), which is designated as "Open" Class L. The North Algodones Dunes Wilderness

(Class C) is closed to OHV use, as is East Mesa lands surrounding U.S. Navy bombing target 68. Figure 3.1-2 depicts OHV designations under the existing 1987 RAMP.

3.1.2.2 Recreation Area Management Plan

The BLM prepared a RAMP in 1987 to provide direction regarding resolving issues that were being experienced at the dunes. The RAMP included use statistics for 1977, 1978, and 1985; projected visitation and densities for 1986 through 2000; descriptions of use areas, and identification of the major issues at the dunes.

Public workshops were held to identify and prioritize management issues, concerns, and problems. The 12 major issues categories identified at the workshops are listed below:

- Recreation opportunities
- Safety and emergency services
- Resource protection and enforcement
- Protection of Wilderness suitability
- Public contact and interpretation
- Facility development
- Operations and maintenance
- Concessions and vendors
- Acquisition of legal access and undeveloped state and private inholdings
- Compatibility of land uses
- Use fees
- Potential Desert Plan amendments

Ten of these issue categories were addressed by the 1987 RAMP. Two categories, Use fees and Potential Desert Plan amendments, were addressed in other forums. The 1987 RAMP included:

- A series of management objectives to be applied to the entire ISDRA
- Multiple-Use Class objectives
- Management constraints (the CDCA Plan, other activity plans, authorized uses other than recreation, and Wilderness interim management constraints)

The management program outlined in the 1987 RAMP included management prescriptions for the 10 major issue categories and prioritized them into four funding levels. The funding levels included Level 1 (reduced funding), Level 2 (maintain present management capability), Level 3 (modest improvements), and Level 4 (significant improvement in management capability) (BLM, 1987).

3.1.2.3 Recreation Opportunity Spectrum

The BLM is committed to providing opportunities for visitors to obtain various types of outdoor recreational experiences and benefits dependent upon a combination of (1) the kind of activity desired, (2) the physical or locational setting, and (3) the level of experiences. The planning tool used to consider these opportunities is called the Recreational Opportunity Spectrum. The purposes of a ROS inventory are to:

- Identify, delineate, classify, and record areas into recreation opportunity classes based on their current state of remoteness, naturalness, and expected social experience
- Provide information regarding existing recreation opportunities to decisionmakers to assist them in making decisions on appropriate land uses, resource development objectives, and management prescriptions

The ROS identifies a variety of recreational experience opportunities categorized into six classes. A class is defined by the degree to which it satisfies certain recreational experience needs and is based on the extent to which the natural environment has been modified, the type of facilities provided, the degree of outdoor skills needed to enjoy the area, and the relative density of recreational use. The ROS classes are:

- Primitive (P)
- Semi-Primitive Non-Motorized (SPNM)
- Semi-Primitive Motorized (SPM)
- Roaded Natural (RN)
- Rural (R)
- Urban (U)

The ROS classes have been described previously in Chapter 2 of this DEIS.

The BLM has not performed a ROS inventory of the lands within the ISDRA, nor has it designated those lands a relative ROS classification.

3.1.3 Existing Recreation Resources

3.1.3.1 Recreation Facilities

The area available for overnight camping with large conveyances (e.g., trailers and motorhomes) is well defined and delineated to the visiting public. The acreage that is suitable for overnight camping is primarily along Gecko Road, eastern end of SR-78, northern portion of Ted Kipf Road, and the area adjacent to and south of I-8. The acreage available for overnight camping and the number of available camp sites is provided in Table 3.1-1.

Table 3.1-1 Acreage and Number of Camp Sites by Management Area and Camping Area

AREA	ACREAGE AVAILABLE FOR CAMP SITES[A]	NUMBER OF AVAILABLE CAMP SITES
Gecko Management Area		
• Cement Flats	4	7
• Camping Pads 1-5	13	47
• Gecko Campground	41	74
• Keyhole Campground	0.5	1
• Roadrunner Campground	12	22
• Subtotal	70.5	151
Buttercup Management Area		
• Buttercup Campground	69	124
• Midway Campground	6	22
• Grays Well (dispersed area)	357	643
• Subtotal	432	789
Mammoth Management Area	1,000	1,800
Glamis Management Area	2,014	3,625

Table 3.1-1 Acreage and Number of Camp Sites by Management Area and Camping Area

AREA	ACREAGE AVAILABLE FOR CAMP SITES[A]	NUMBER OF AVAILABLE CAMP SITES
Adaptive Management Area	11,840	8
Ogilby Management Area	1,539	1[b]
Dune Buggy Flats Management Area	1,800	1[b]
North Algodones Dunes Management Area	27,089	19[b]
Total	**45,784.5**	**6,394**

[a]Source: Haas, 2002.

[b]No motorized vehicles allowed at these camp sites.

These management areas and camping areas are depicted in Figures 3.1-3a and 3.1-3b.

The camping areas consist of open, undeveloped areas that provide dispersed camping opportunities. Paved roads provide access to the camping areas. Individual campsites are not delineated, but hard surfaces are provided in certain areas for vehicles to park. Visitors select their camping area on a first-come, first-served basis.

Pit toilet facilities and trash dumpsters are provided at the camping areas in the Gecko, Glamis, and Buttercup Management Areas.

Although socialization is a very important part of the experience, visitors want a degree of privacy and personal space around the overnight camping locations. Therefore, they will often encircle their vehicles (e.g., wagon train style) or use markers and flagging to delineate their desired area.

3.1.3.2 Recreation Visitation

The earliest known annual visitation at the ISDRA was 150,000 in the late 1970s; the number of visits had increased to 225,900 visits in 1985 (BLM, 1987). The average annual number of visits to the ISDRA over the 2-year period of 1999 to 2001 was over 750,000 (BLM, 2001q). Between October 1, 1999, and September 30, 2000, there were 867,753 visits to the ISDRA. This is shown by camping area in Table 3.1-2.

It is estimated that 10 percent of current visitation originates locally; 80 percent originates within a region bounded by San Diego, Los Angeles, Phoenix and Tucson; and 10 percent originates from other parts of the United States (Haas, 2002).

Ninety percent of the visitors to ISDRA are associated with OHV recreation. The remaining 10 percent are largely associated with non-motorized recreation in the North Algodones Dunes Wilderness (Haas, 2002).

Table 3.1-2 ISDRA Visits (1999-2000)[a]

SITE	VISITSB	VISIT (%)
Buttercup Campground	107,639	12.4
Dispersed – Imperial Dunes	571,319	65.8
Gecko Campground	107,639	12.4
Midway Camping Pad	16,231	1.9
Plank Road	16,231	1.9
Roadrunner Campground	48,694	5.6
Total	867,753	100.0

[a]The 1999-2000 year is defined as October 1, 1999, through September 30, 2000.

[b]A "Visit" occurs when one person visits BLM lands to engage in any recreational activity, whether for a few minutes, full day, or more.

Source: BLM, 2001q

Over 80 percent of the visitors to the ISDRA are repeat visitors (USFS, 1993). It is common for a camping party to consist of three or four generations of relatives who have been visiting the area over the years. This provides a sense of tradition, nostalgia, history, intergenerational bonding, and a sense of place attachment.

Typical visitation includes relatively large groups for overnight stays. It is common to see overnight groups with 3 to 6 recreation "sleeping" vehicles, accompanying trailers, 12 to 18 family members or friends, and multiple types of OHVs, staying for a 3-day weekend. Groups primarily camp in large recreation vehicles accompanied with many conveniences of home (e.g., chairs, tables, awnings, grills, firewood) (Haas, 2002).

The ISDRA is open to the public year-round. However, due to high temperatures throughout the dunes during the summer months, the recreation season is considered to be October 1 through Easter of each year. Because the date of Easter varies from year to year and "spring breaks" offered by the various schools also differ, the end of the recreation season for this analysis is considered to be April 15.

Visitation to ISDRA is unevenly distributed throughout the year. Fifty percent of the annual visitation occurs during approximately 11 percent of the recreation season (i.e., on 21 holiday days out of 197 days in the season). These holiday days are significant spikes in visitation. Table 3.1-3 shows the campsite occupancy rate for the ISDRA throughout the year.

Table 3.1-3 Campsite Occupancy Rate for the ISDRA[a]

TIME PERIOD	PERCENT OF DAYS DURING THE RECREATION SEASON[B]	OCCUPANCY RATE
Major holidays, weekends, and shoulder days	11	100+
Nonholiday weekends (Friday through Sunday)	38	30
Weekdays (Monday through Thursday)	51	10

[a]The recreation season is considered to be October 1 - April 15.
[b]The number of days in the recreation season is 197.
[c]The number of days included in "major holidays, weekends, and shoulder days" is 21.

As shown in Table 3.1-3, during 11 percent of the recreation season, i.e., the six major holidays, the camping areas exceed their capacity. Therefore, demand exceeds supply (capacity) during the six major holidays, affecting 50 percent of the visitors who come to the ISDRA in a year.

During 38 percent of the nonholiday weekends during the recreation season, the camping areas are 30 percent full. On weekdays during the recreation season, 51 percent of the time the camping areas are 10 percent full. This table also shows that, during 89 percent of the recreation season, the ISDRA camping areas are less than or equal to 30 percent full.

3.1.3.3 Visitor Capacity

For this analysis, visitor capacity is defined as the number of visitors that can be accommodated in an area. Table 3.1-4 shows the estimated visitor capacity by management area and camping area in the ISDRA.

Table 3.1-4 Visitor Capacity by Management Area and Camping Area

AREA	VISITOR CAPACITY[A]
Gecko Management Area	
• Cement Flats	151
• Camping Pads 1-5	984
• Gecko Campground	1,534
• Keyhole Campground	21
• Roadrunner Campground	462
Subtotal	3,172
Buttercup Management Area	
• Buttercup Campground	2,604
• Midway Campground	462
• Grays Well (dispersed area)	13,503
Subtotal	16,569
Mammoth Management Area	37,800
Glamis Management Area	76,125
Adaptive Management Area	28[b]
Ogilby Management Area	4[b]

Table 3.1-4 Visitor Capacity by Management Area and Camping Area

AREA	VISITOR CAPACITY[A]
Dune Buggy Flats Management Area	4[b]
North Algodones Dunes Management Area	67[b]
Total	**133,769**

[a]The visitor capacity presented is based on the acreage available for camping, the number of available campsites, an average number of vehicles per camping party, and an average number of people per vehicle.

[b]No motorized vehicles allowed at these camp sites.

The supply of recreation opportunities at the ISDRA exceeds the demand during 89 percent of the recreation season (October 1 to April 15); that is, there is adequate capacity for those visitors who visit the ISDRA any time other than the six major holiday weekends.

The exceedance of capacity on the holiday weekends results in a change in several important social and managerial attributes of the setting, which then leads to a change in the recreation opportunity being provided. There is a change from providing the intended Rural, Roaded Natural, and Semi-Primitive type recreation opportunity to an urban recreation opportunity.

The social attributes at ISDRA change on the six holiday weekends because many visitors frequent the ISDRA to engage in illegal activities (e.g., alcohol, drug use, speeding) and inappropriate behavior, which is inconsistent with the intended ISDRA recreation opportunity. Therefore, when capacity is being exceeded (on the six holiday weekends), the supply of OHV recreational opportunities that the ISDRA is intended to provide is not available.

3.2 BIOLOGICAL RESOURCES

3.2.1 Regulatory Framework

3.2.1.1 Federal Endangered Species Act

The Federal Endangered Species Act (FESA) of 1973, as amended, provides the regulatory framework for the protection of threatened and endangered (T&E) plant and animal species formally listed under the FESA, as well as their designated critical habitat. The USFWS, in consultation with other federal agencies (see Section 3.2.2.), administers and enforces the FESA. The following terms are defined by the FESA:

Endangered: Any species that is in danger of extinction throughout all or a significant portion of its range.

Threatened: Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Proposed: Any species that has been proposed for listing as a threatened or endangered species.

Critical Habitat: "…the specific areas within the geographical area occupied by the species … on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection…"

3.2.1.2 California Endangered Species Protection

The California Endangered Species Act (CESA) of 1984 and the California Native Plant Protection Act (CNPPA) of 1977 provide the framework for protection of California listed T&E plant or animal species or rare plant species. Protection by the state is also offered to candidate species that have been accepted for state review for potential listing as endangered, threatened, or rare. The following terms are defined by the CESA:

- Endangered: A native species or subspecies of animal or plant that is endangered of becoming extinct throughout all, or a significant portion, or its range due to one or more causes, including loss of habitat, change of habitat, overexploitation, predation, competition, or disease.
- Threatened: A native species or subspecies of animal or plant that, although not currently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts required by Chapter 1.5 of the California Fish and Game Code.
- Rare: A species, subspecies, or variety of plant is rare when, although not currently threatened with extinction, it is in such small numbers throughout its range that it may become endangered if its present environment worsens.
- Candidate: A native species or subspecies of animal or plant that the California Fish and Game Commission (CFGC) has formally noticed as being under review by the CDFG for addition to either the endangered or

threatened species list, or a species for which the CFGC has published a notice of proposed regulation to add the species to either list.

- Species of Special Concern: Native species or subspecies of animal or plant that has become vulnerable to extinction because of declining population levels, limited ranges, or rarity. The goal is to prevent these species from becoming endangered by addressing the issues of concern early enough to secure long-term viability.

3.2.1.3 BLM Special-Status and Sensitive Species

The BLM recognizes a special-status species as an animal or plant that meets any one of the following criteria: (1) it is federally listed as endangered or threatened; (2) it is federally proposed as endangered or threatened; (3) it is a federal candidate for listing; (4) it is state listed as Rare, Threatened, or Endangered; or (5) it has been designated by the BLM State Director as a sensitive species. Additionally, all List 1B plants in the 6th edition of the California Native Plant Society (CNPS) Inventory that are on BLM lands, and do not meet any of the first four of the special-status species criteria, are considered sensitive species.

3.2.1.4 California Native Plant Society

The CNPS is a professional society of botanists, biologists, scientists, and other associated professionals who have accumulated a statewide database on California native plant abundance and distribution. The CNPS has developed four categories to describe the status of plants species as: rare, threatened, endangered, or extinct. Although these listings do not afford legal status or protection for the species, agencies consult the list in their planning process for activities that may potentially impact any of these species. The listing categories are as follows:

- CNPS 1A: Plant Species presumed to be extinct in California.
- CNPS 1B: Plant species presumed to be rare, threatened, or endangered in California and elsewhere.
- CNPS 2: Plant species presumed to be rare, threatened, or endangered in California but common elsewhere.
- CNPS 3: Plant species for which more information is needed to be properly categorized, and includes an assemblage of taxa that have been transferred from other lists or have been suggested to CNPS for consideration.
- CNPS 4: Plant species that are not currently threatened or vulnerable but are considered to have limited distribution in California and, because of their uncommon status, should be monitored.

3.2.1.5 California Natural Diversity Database

The California Natural Diversity Database (CNDDB) is a computerized inventory of data on the general location and condition of California's rare, threatened, and endangered animals, plants, and natural communities that CDFG maintains. The database also maintains inventories of federally listed T&E species. The CNDDB includes species that the scientific community

feels deserving of an official listing, species proposed for federal listing, U.S. Forest Service (USFS) special-status species, and state candidate species.

3.2.1.6 Migratory Bird Treaty Act

The USFWS administers and enforces the Migratory Bird Treaty Act (MBTA) of 1918 (16 USC 701-718h). Virtually all birds are protected under the MBTA, with four exceptions (California quail, English sparrows, common pigeons, and European starlings). The MBTA controls the taking of these birds, their nests, eggs, parts, or products without obtaining a permit from the USFWS.

3.2.1.7 U.S. Fish and Wildlife Service Consultation and Conference

Section 7 of the FESA mandates federal agencies that fund, authorize, or carry out actions that may affect listed species or adversely modify their critical habitat must consult with the USFWS. It is the responsibility of the action agency to determine if their actions may affect listed species. If the action agency makes a "may affect" determination, then that agency should initiate an informal consultation with the USFWS. During informal consultation, it will be determined if the action will adversely affect the species, in which case formal consultation will be initiated.

Formal consultation is not required if the USFWS concurs in writing that an action will not adversely affect the species. However, if it is determined that the action may adversely affect T&E species, formal consultation will be initiated. As part of the formal consultation process, the action agency prepares a biological assessment/evaluation that contains a description of the proposed action, map of the project area, potential effects to listed species or critical habitat, and any relevant reports.

Once completed, formal consultation results in a biological opinion issued from the USFWS to the action agency. The biological opinion will contain the following information: (1) an analysis of the direct, indirect, interrelated, interdependent, and cumulative effects; (2) a determination of whether the action is likely or not likely to jeopardize the continued existence of the species; (3) an incidental take statement for wildlife that will identify the anticipated level of take; (4) mandatory reasonable and prudent measures and the terms and conditions to minimize incidental take; and (5) discretionary conservation recommendations that would further minimize impacts and promote conservation of the species.

When a proposed action affects a species proposed for listing as threatened or endangered, a formal conference (as opposed to a consultation for a listed species) with the USFWS may be required. Unlike biological opinions, recommendations made in conference opinions are advisory and therefore nonbinding. The primary purpose of conferencing is to avoid delay of a proposed action should a species proposed for listing become listed, and to ensure that the proposed action does not jeopardize a species' recovery potential. Should a species become formally listed prior to implementation of the proposed action, a federal agency is required to informally consult with the USFWS regarding the conference opinion. In the absence of additional new information, USFWS may adopt the formal conference opinion as the

biological opinion without the federal agency having to initiate formal consultation.

The BLM is requesting formal consultation on the Threatened Peirson's milk-vetch (*Astragalus magdalenae* var. *peirsonii*) and desert tortoise (*Gopherus agassizii*). A formal conference is also being requested for the Proposed Threatened flat-tailed horned lizard (*Phrynosoma mcallii*).

3.2.1.8 BLM Policies and Plans

The goal of the California Desert Conservation Act (CDCA) Plan is to provide for the use of public lands and resources of the CDCA, including economic; educational; scientific; and recreational uses; as well as protection of environmental, cultural, and aesthetic values of the desert and its future productivity. Carrying forth the management principles from FLPMA, the Plan establishes MUCs for the lands involved and establishes a framework for managing the various resources within these classes. The four uses include: Class C (controlled), Class L (limited), Class M (moderate) and Class I (intensive).

The CDCA incorporates the ISDRA and therefore provides general management guidance for the area. The CDCA Plan decision rationale and summary of resource values for Planning Unit Number 103, which includes the Algodones Dunes Wildlife Habitat Area (WHA), delineated the management goals for protection of rare and endangered wildlife and vegetation; enhancement of wildlife values; and extensive monitoring, especially of potential impacts to these resources from vehicle use.

FLPMA defines an Area of Critical Environmental Concern (ACEC) as an area within public lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values; fish and wildlife resources; other natural system processes; or to protect human life and safety from natural hazards (USDI, 1980). ACECs are managed for special use, but with special restrictions; and they do not preclude appropriate development if protection of sensitive values can be assumed.

The Plan Area (buffer zone) includes a portion of the East Mesa ACEC, located adjacent to the southwest corner of the ISDRA. This ACEC was established on September 2, 1988, to protect the flat-tailed horned lizard (*Phrynosoma mcallii*) and two rare plant species: Thurber's pilostyles (*Pilostyles thurberi*) and Salton milk-vetch (*Astragalus crotalariae)*, as well as cultural resources associated with the Lake Cahuilla shoreline. No management plan has been written for this ACEC (BLM, 2001b).

3.2.2 Habitat Types

The biological resources of the Plan Area includes several dune habitats that support a variety of desert plant and wildlife species, including special-status and endemic species found only at the Imperial Sand Dunes. The primary habitat types associated with the dune system are: Creosote Bush Scrub, Microphyll Woodland, Psammophytic Scrub, and Canal-Influenced Vegetation (Westec, 1977; BLM, 1987). Each habitat type is depicted in Figure 3.2-1 and described in detail below. Table 3.2-1 lists the plant species

that are known or have the potential to occur in the ISDRA. Table 3.2-2 lists the wildlife species that are known or have the potential to occur in the ISDRA.

Table 3.2-1 List of Plant Species That Are Known or Have the Potential to Occur in the ISDRA

COMMON NAME	SCIENTIFIC NAME	STATUS
Algodones Dunes sunflower	*Helianthus niveus* ssp. *tephrodes*	SE/CNPS-1B
Arrow weed	*Pluchea sericea*	
Big galleta	*Hilaria rigida*	
Birdcage evening-primrose	*Oenothera deltoides*	
Borrego milk-vetch	*Astragalus lentiginosus* var. *borreganus*	CNPS-4
Brittlebush	*Encelia farinosa*	
Brown plume wirelettuce	*Stephanomeria pauciflora*	
Burrobush	*Ambrosia dumosa*	
Burrobrush	*Hymenoclea salsola*	
California ditaxis	*Ditaxis serrata* var. *california*	CNPS-3
California threeawn	*Aristida californica*	
Carrizo mallow	*Sphaeralacea orcuttii*	
Cattail	*Typha* spp.	
Common sandpaper plant	*Petlonyx thurberi*	
Common sunflower	*Helianthus annuus*	
Coulter's lyrepod	*Lyrocarpa coulteri var. palmeri*	CNPS-4
Creosote bush	*Larrea tridentata*	
Crown-of-thorns	*Koeberlina spinosa* ssp. *tenuispina*	CNPS-2
Desert buckwheat	*Eriogonum deserticola*	
Desert dicoria	*Dicoria canescens*	
Desert lily	*Hesperocallis undulata*	
Desert panicum	*Panicum urvilleanum*	
Desert starvine	*Brandegea bigelovii*	
Desert thron-apple	*Datura discolor*	
Desert unicorn plant	*Proboscidea altheafolia*	CNPS-4
Desert willow	*Chilopsis linearis*	
Dyebush	*Dalea emoryi*	
Fairy duster	*Calliandra eriophylla*	CNPS-2
False daisy	*Eclipta alba*	
Fennel-leaf pondweed	*Potamogeton pectinatus*	

Table 3.2-1 List of Plant Species That Are Known or Have the Potential to Occur in the ISDRA

COMMON NAME	SCIENTIFIC NAME	STATUS
Foxtail cactus	*Coryphantha alversonii*	CNPS-4
Giant reed	*Arundo donax*	
Giant Spanish needle	*Palafoxia arida* var. *gigantea*	BLM/CNPS-1B
Glandular ditaxis	*Ditaxis clariana*	CNPS-2
Hairy stickleaf	*Mentzelia hirsutissima*	CNPS-2
Harwood milk-vetch	*Astragalus insularis* var. *harwoodii*	CNPS-4
Honey mesquite	*Prosopis glandulosa*	
Horseweed	*Conyza canadensis*	
Ironwood	*Olneya tesota*	
Lineleaf white puff	*Oligomeris linifolia*	
Longleaf jointfir	*Ephedra trifurca*	
Mediterranean grass	*Schismus barbatus*	
Mormon tea	*Ephedra trifurca*	
Munz's cholla	*Opuntia munzii*	BLM/CNPS-1B
Orocopia sage	*Salvia greatei*	BLM/CNPS-1B
Palmer's crinklemat	*Coldenia palmeri*	
Palo verde	*Cercidium floridum*	
Peirson's milk-vetch	*Astragalus magdalenae* var. *peirsonii*	FT/SE/CNPS-1B
Plicate Coldenia	*Tiquilia plicata*	
Ribbed cryptantha	*Cryptantha costata*	CNPS-4
Rock nettle	*Eucnida rupestris*	CNPS-2
Rush milkweed	*Ascelpias subulata*	
Sand food	*Pholisma sonorae*	BLM/CNPS-1B
Shortspike watermilfoil	*Myripphyllum exalbescens*	
Small-flowered tamarisk	*Tamarix parviflora*	
Smoke tree	*Psorothamnus spinosa*	
Spiny chloracantha	*Aster spinosus*	
Spotted cadythumb	*Polygonum fusiforme*	
Thurber's pilostyles	*Pilostyles thurberi*	CNPS-4
White ratany	*Krameria grayi*	
White sweetclover	*Melilotus albus*	
Wiggins' cholla	*Opuntia wigginsii*	CNPS-3
Wiggins' croton	*Croton wigginsii*	SR/CNPS-2

Table 3.2-1 List of Plant Species That Are Known or Have the Potential to Occur in the ISDRA

COMMON NAME	SCIENTIFIC NAME	STATUS
Winged cryptantha	*Cryptantha holoptera*	CNPS-4
Woolly desert marigold	*Baileya pleniradiata*	

Legend:
FT: Federal threatened
SE: California state endangered
SR: California state rare
BLM: BLM Sensitive Species
CNPS: California Native Plant Society:
1B – Taxa determined to be rare, threatened, or endangered in California and elsewhere
2 – Species rare or endangered in California but common elsewhere
3 – More information on status needed
4 – Species of limited distribution

Table 3.2-2 List of Wildlife Species That Are Known or Have the Potential to Occur in the ISDRA

COMMON NAME	SCIENTIFIC NAME	STATUS
Mammals		
American badger	*Taxidea taxa*	
Antelope ground squirrel	*Ammospermophilus leucurus*	
Big brown bat	*Eptesicus fuscus*	
Black-tailed hare	*Lepus californicus*	
California leaf-nosed bat	*Macrotus californicus*	BLM
Cave myotis	*Myotis velifer*	BLM
Colorado River cotton rat	*Sigmodon arizonae plenus*	
Coyote	*Canis latrans*	
Desert cottontail rabbit	*Sylvilagus audubonii*	
Desert kangaroo rat	*Dipodomys deserti*	
Desert pallid bat	*Antrozous pallidus pallidus*	
Desert woodrat	*Neotoma lepida*	
Greater western mastiff bat	*Eumops perotis californicus*	
Kit fox	*Vulpes macrotis*	
Merriam's kangaroo rat	*Dipodomys merriami*	
Mule deer	*Odocoileus hemionus*	
Occult little brown bat	*Myotis lucifugus occultism*	
Raccoon	*Procyon lotor*	
Roundtail ground squirrel	*Spermophilus tereticaudus*	
Small-footed myotis	*Myotis ciliolabrum*	
Spotted bat	*Euderma maculatum*	BLM
Townsend's big-eared bat	*Plecotus townsendii*	BLM
Western pipistrel	*Pipistrellus hesperus*	

Table 3.2-2 List of Wildlife Species That Are Known or Have the Potential to Occur in the ISDRA

COMMON NAME	SCIENTIFIC NAME	STATUS
White-throated woodrat	*Neotoma albigula venusta*	
Wild burro	*Equus asinus*	
Yuma hispid cotton rat	*Sigmodon hispidus eremicus*	
Yuma myotis	*Myotis yumanensis*	
Yuma mountain lion	*Felis concolor browni*	
Birds		
American Coots	*Fulica americana*	
American Kestrel	*Falco sparverius*	
Arizona Bell's Vireo	*Vireo bellii arizonae*	SE
Barn Owl	*Tyto alba*	
Black Tern	*Coalitionist niger*	
Black-tailed Gnatcatcher	*Polioptila melanura*	
Black-throated Sparrow	*Amphispiza bilineata*	
Burrowing Owl	*Athene cunicularia*	BLM
Cactus Wren	*Campylorhynchus burnnecapillus*	
Cliff Swallow	*Hirundo pyrrhonota*	
Common Yellowthroats	*Geothlypis trichas*	
Crissal Thrasher	*Toxostoma dorsale*	
Ferruginous Hawk	*Buteo regalis*	
Gambel's Quail	*Lophortyx gambelli*	
Gila Woodpecker	*Melanerpes uropygialis*	SE
Gilded Northern Flicker	*Colaptes auratus chrysoides*	
Golden Eagle	*Aquila chrysaetos*	
Great Horned Owl	*Bubo virginianus*	
House Finch	*Carpodacus mexicanus*	
Ladder-backed Woodpecker	*Picoides scalaris*	
LeConte's Thrasher	*Toxostoma lecontei*	BLM
Lesser Nighthawk	*Chordeiles acutipennis*	
Loggerhead Shrike	*Lanius ludovicianus*	
Long-eared Owl	*Asio otus*	
Marsh Wren	*Cistothorus palustris*	
Merlin	*Falco columbarius*	
Mountain Plover	*Charadrius montanus*	
Mourning Dove	*Zenaida macroura*	
Northern Harrier	*Circus cyaneus*	
Peregrine Falcon	*Falco peregrinus*	SE
Prairie Falcon	*Falco mexicanus*	

Table 3.2-2 List of Wildlife Species That Are Known or Have the Potential to Occur in the ISDRA

COMMON NAME	SCIENTIFIC NAME	STATUS
Red-tailed Hawk	*Buteo jamaicensis*	
Red-wing Blackbird	*Agelaius phoeniceus*	
Say's Phoebe	*Sayornis saya*	
Sharp-shinned Hawk	*Accipiter striatus*	
Southwestern Willow Flycatcher	*Empidonax trailii extimus*	FE/SE
Turkey Vulture	*Cathartes aura*	
Vaux's Swift	*Chaetura vauxi*	
Verdin	*Auriparus subulata*	
Warbling Vireo	*Vireo gilvus*	
Western Flycatcher	*Empidonax difficilis*	
Western Least Bittern	*Lxobrychus exilis hasperus*	
Western Screech Owl	*Otus kennicottii*	
Western Yellow Billed Cuckoo	*Coccyzus americanus occidentalis*	SE
White-crowned Sparrow	*Zonotrichia leucophrys*	
White-faced Ibis	*Plegadis chichi*	
Wilson's Warbler	*Wilsonia pusilla*	
Yellow-headed Blackbird	*Xanthocephalus zanthocephalus*	
Yellow-rumped Warbler	*Dendroica coronata*	
Insects		
Andrews' dune scarab beetle	*Psuedocotalapa andrewsi*	
Brow-tassel weevil	*Trigonoscuta brunnotasselata*	
Carlson's dune beetle	*Anomala carlsoni*	
Cheeseweed owlfly	*Oliarves clara*	
Hardy's dune beetle	*Anomala hardyorum*	
Amphibians		
Arizona southwestern toad	*Bufo microscaphus microscaphus*	
Couch's spadefoot toad	*Scaphiopus couchi*	BLM
San Sebastian leopard frog	*Rana yavapaiensis*	BLM
Reptiles		
Chuckwalla	*Sauromalus obesus*	
Colorado Desert fringe-toed lizard	*Uma notata*	BLM
Desert iguana	*Dipsosaurus dorsalis*	
Desert tortoise	*Gopherus agassizii*	FT/ST
Flat-tailed horned lizard	*Phrynosoma mcallii*	FPT
Rosy boa	*Lichanura trivirgata*	
Side-blotched lizard	*Uta stansburiana*	

Table 3.2-2 List of Wildlife Species That Are Known or Have the Potential to Occur in the ISDRA

COMMON NAME	SCIENTIFIC NAME	STATUS
Sidewinder rattlesnake	*Crotalus cerastes*	
Western whiptail lizard	*Cnemidophorus tigris*	
Zebra-tailed lizard	*Callisaurus draconoides*	

Legend:
FE: Federal listed as endangered
FT: Federal listed as threatened
FPT: Federal proposed as threatened
SE: California state listed as endangered
ST: California state listed as threatened
BLM: BLM Sensitive Species

3.2.2.1 Creosote Bush Scrub

Creosote bush scrub is the most common habitat type in the Colorado Desert and typically occurs on well-drained secondary soils of slopes, fans, and valleys. Within the ISDRA, this habitat type occurs on the relatively stable soils along the periphery of the dune system. It rarely occurs in the central portion of the ISDRA where shifting dunes are prevalent. This habitat type is generally characterized by relatively barren ground between widely spaced shrubs. To the west of the ISDRA, the habitat consists of almost pure stands of creosote bush. On the eastern boundary of the ISDRA, the vegetation is more diverse due to the topographic relief of the dunes and runoff from the nearby Chocolate and Cargo Muchacho Mountains. The creosote bush scrub within the alluvial fan between the desert washes forms a transitional zone with the microphyll woodland habitat type. This habitat type covers approximately 51,825 acres of the Plan Area, or 23 percent. Characteristic plant species of this habitat type include creosote bush (*Larrea tridentata*), brittlebush (*Encelia farinosa*), and burrobush (*Ambrosia dumosa*). Less abundant species associated with this habitat type include woolly desert marigold *(Baileya pleniradiata*), birdcage evening-primrose (*Oenothera deltoides*), dyebush (*Dalea emoryi*), longleaf jointfir (*Ephedra trifurca*), desert thorn-apple (*Datura discolor*), big galleta (*Hilaria rigida*), white rhatany (*Krameria grayi*), and brown plume wirelettuce (*Stephanomeria pauciflora*).

The wildlife commonly associated with this creosote bush scrub include desert iguana (*Dipsosaurus dorsalis)*, zebra-tailed lizard (*Callisaurus draconoides*), western whiptail lizard (*Cnemidophorus tigris*), Red-tailed Hawk (*Buteo jamaicensis*), Mourning Dove (*Zenaida macroura*), Lesser Nighthawk (*Chordeiles acutipennis*), Black-tailed Gnatcatcher (*Polioptila melanura*), Yellow-rumped Warbler *(Dendroica coronata*), White-crowned Sparrow (*Zonotrichia leucophrys*), big brown bat (*Eptesicus fuscus*), kit fox (*Vulpes macrotis*), roundtail ground squirrel (*Spermophilus tereticaudus*), and black-tailed hare (*Lepus californicus*). Special-status or sensitive wildlife species that may occur in this habitat include desert tortoise, flat-tailed horned lizard, Western Burrowing Owl (*Athene cunicularia*), and LeConte's Thrasher (*Toxostoma lecontei*). The endemic Hardy's dune beetle *(Anomala*

hardyorum) and Carlson's dune beetle (*Anomala carlsoni*) are also found in this habitat type (Hardy and Andrews, 1979).

3.2.2.2 Psammophytic Scrub

Psammophytic scrub occurs within the interior dune system where active and partially stabilized dunes are found. This habitat type occurs most frequently between active dunes in depressions that are commonly termed "bowls." The soils in these areas consist primarily of fine sand. As the dunes shift from year to year, the bowls generally shift as well. Vegetation is adapted to relatively high sand mobility and deep water percolation. Most of these plant species are capable of rapid growth given favorable soil moisture conditions. This habitat type covers approximately 108,658 acres of the Plan Area, or 48 percent. Common vegetation of this habitat type include Mormon tea (*Ephedra nevademsis),* desert buckwheat *(Eriogonum deserticola*), desert dicoria (*Dicoria canescens*), common sandpaper plant (*Petalonyx thurberi*), desert panicum (*Panicum urvilleanum*), and plicate coldenia *(Tiquilia plicata*). Additionally, birdcage evening primrose and desert lily (*Hesperocallis undulata*) may occur in the relatively stable dunes that form a transitional zone with the creosote bush scrub habitat.

The wildlife commonly associated with psammophytic scrub include Black-tailed Gnatcatcher, Mourning Dove, Cliff Swallow (*Hirundo pyrrhonota*), coyote (*Canis latrans*), roundtail ground squirrel, desert kangaroo rat (*Dipodomys deserti*), and black-tailed hare. The Colorado desert fringe-toed lizard (*Uma notata*) is the only sensitive wildlife species known to almost exclusively inhabit this area. The endemic Andrew's dune scarab beetle (*Psuedocotalapa andrewsi*) is also found in this habitat type (Hardy and Andrews, 1979).

3.2.2.3 Microphyll Woodland

To the east of the dune system is a large alluvial fan draining the Chocolate and Cargo Muchacho mountains. The alluvial fan is dissected by numerous ephemeral washes and separated by expansive, level interfluves. The desert microphyll woodland typically is best developed in the larger drainages where dense stands of a variety of trees occur. Microphyll woodland is generally found along the margins of these dry channels, and around the cul-de-sac sinks of their terminii. This habitat type covers approximately 65,382 acres of the Plan Area, or 29 percent. Vegetation is generally sparse in the open wash areas between the sinks. Typical vegetation of this habitat type include palo verde (*Cercidium floridum*), ironwood (*Olneya tesota*), smoke tree (*Psorothamnus spinosa*), and to a lesser degree honey mesquite (*Prosopis glandulosa*), desert willow (*Chilopsis linearis*), and desert unicorn plant *(Proboscidea altheafolia*). Depending upon rainfall, the understory in the plains is generally composed of shrubs and annuals such as desert starvine (*Brandegea bigelovii),* carrizo mallow (*Sphaeralacea orcuttii*), California threeawn, Mediterranean grass (*Schismus barbatus*), lineleaf white puff (*Oligomeris linifolia*), and rush milkweed (*Asclepias subulata*).

The plant diversity and density combined with the micro-topographic variability associated with the washes, accounts for a high diversity of wildlife in the microphyll woodlands. The wildlife commonly associated with this

habitat type include side blotched lizard (*Uta stansburiana*), western whiptail lizard, zebra-tailed lizard, sidewinder rattlesnake (*Crotalus cerastes*), Red-tailed Hawk, Gambel's Quail (*Lophortyx gambelli*), Mourning Dove, Ladder-backed Woodpecker (*Picoides scalaris*), Verdin (*Auriparus flaviceps*), Western Flycatcher (*Empidonax difficilis*), Cactus Wren (*Campylorhynchus burnneicapillus*), Warbling Vireo (Vireo gilvus), Wilson's Warbler (*Wilsonia pusilla*), House Finch (*Carpodacus mexicanus*), Black-tailed Gnatcatcher, White-crowned Sparrow (*Zonotrichia leucophrys*), western pipistrelle bat (*Pipistrellus hesperus*), coyote, kit fox, mule deer (*Odocoileus hemionus*), white-tailed antelope squirrel (*Ammospermophilus leucurus*), black-tailed hare, and desert cottontail (*Sylvilagus audubonii*). Special-status or sensitive wildlife species that may occur in this habitat include desert tortoise, Couch's spadefoot toad (*Scaphiopus couchi*), Gila Woodpecker (*Melanerpes uropygalis*), Western Burrowing Owl, and LeConte's Thrasher.

The wildlife guzzlers installed by the CDFG to partially mitigate impacts from the construction of the New Coachella Canal has created limited herbaceous weedy vegetation within the microphyll woodland. The presence of water and forage around the guzzlers has attracted mule deer from the Chocolate Mountain range. Mule deer are known to use the microphyll woodlands associated with washes as corridors through the Algodones Dunes Wilderness Area and into the southern part of Mammoth Wash area. It is thought that the Yuma puma (*Felis concolor browni)* has followed the deer into the woodland to prey the mule deer.

3.2.2.4 Canal-Influenced Vegetation

Both the Coachella and All American Canals support hydrophytic vegetation that is subject to periodic eradication efforts. Although the canals are lined, some seepage occurs and promotes the growth of hydrophytic vegetation. Submergent species include shortspike watermilfoil (*Myriopphyllum exalbescens)* and fennel-leaf pondweed *(Potamogeton pectinatus)*. Emergent and upland species include cattails *(Typha* spp.*),* spotted cadythumb (*Polygonum fusiforme*) horseweed (*Conyza canadensis),* spiny chloracantha *(Aster spinosus*), giant reed *(Arundo donax),* small-flowered tamarisk (*Tamarix parviflora*), false daisy *(Eclipta alba),* common sunflower *(Helianthus annuus),* white sweetclover *(Melilotus albus),* and arrow weed *(Pluchea sericea*).

This manmade habitat is utilized by a variety of birds including American Coot *(Fulica americana*), Red-wing Blackbird (*Agelaius phoeniceus*), Yellow-headed Blackbird (*Xanthocephalus xanthocephalus*), Common Yellowthroat (*Geothlypis trichas*), and Marsh Wren (*Cistothorus palustris*). Common mammals of this habitat include black-tailed hare, coyote, raccoon (*Procyon lotor*), and American badger (*Taxidea taxus*).

3.2.3 Special-Status Plant Species

The designation of special-status includes federal- and state-listed species under either the federal or CESA, species proposed for federal listing, federal candidate species, and species designated as sensitive by the California State Director of the BLM (these include all plants on List 1B of the most recent CNPS Inventory of Rare and Endangered Plants of California). The following

special-status plant species are known to occur within the Plan Area. Therefore, these species may be affected by activity in the Plan Area. Descriptions of these species are provided below.

3.2.3.1 Peirson's Milk-Vetch (*Astragalus magdalenae* var. *peirsonii*)

Status

Peirson's milk-vetch was proposed as endangered in 1992 and listed as threatened in 1998 (Federal Register, 1998). It is also recognized as endangered by the State of California and as a special-status species by the BLM. The CNPS lists the milk-vetch as a category 1B (rare, threatened, or endangered in California and elsewhere throughout its range) (Tibor, 2001). Critical habitat has not been designated for this species nor has a recovery plan been prepared.

Life History

Peirson's milk-vetch is a short-lived perennial reaching 8 to 30 inches high. The stems and leaves are pubescent, and the leaves are 2 to 6 inches long. The flowers are dull purple and are arranged in 10 to 17 flowered racemes. The resulting seed pods are 0.8 to 1.5 inches long and are inflated with a triangular beak (Bowers, 1996). This species is able to become reproductive in a single season. It generally completes seed production by June. By July, the plant has dropped many of its leaflets and some entire leaves. This condition may persist from July to October. Seedlings may be present in December, although not in great numbers. Seedlings that germinate by November or December may reach the flowering or fruiting stage by March (Romspert and Burk, 1979).

Seeds of the Peirson's milk-vetch are the largest of any North American milk-vetch species (Barneby, 1964). Within this genus, the large seeds are thought to be better adapted to active dunes than small seeds. This may be due to the larger food reserves enabling them to emerge even when deeply buried (Bowers, 1996). Harper et al. (1970), however, noted that there is a trade-off between seed size and seed numbers such that large-seeded plants typically produce fewer seeds. Peirson's milk-vetch seeds are transported within inflated pods that are dispersed by winds across the dunes where they may come to rest within vegetation or depressions. Many seeds fall prey to members of the seed beetle family, Bruchidae. This contributes to a high mortality of seeds and reduced seed crop for this species (Romspert and Burk, 1979).

Peirson's milk-vetch habitat consists of sandy depressions at the base of high dunes and lower established dunes. This species does not extend many lateral roots and, therefore, is more vulnerable if the main stem is broken. The vulnerability of the adult plants in conjunction with the period of seedling establishment during the cooler months, which coincides with the higher usage of the dunes by OHVs, makes this species sensitive to impacts (Romspert and Burk, 1979).

Distribution and Occurrence within the Plan Area

Peirson's milk-vetch, an obligate psammophyte, grows on the slopes and hollows of windblown dunes in the Colorado and Sonoran deserts. According

to Barneby (1964) and Wiggins (1980), it is known from the Imperial Sand Dunes. Additionally, the milk-vetch is known to occur in the Gran Desierto in Sonora, Mexico (Felger, 2000). Although it has been reported from Borrego Valley, San Diego County, California, it has not been observed there for several decades (Tibor, 2001).

The only location where the Peirson's milk-vetch is currently known to occur within the United States is the Imperial Sand Dunes, which supports between 75 and 80 percent of all of the world's known colonies of the species (Federal Register, 1998). The milk-vetch is associated with psammophytic scrub habitat within these dunes. The plant is generally scattered throughout the dune complex with a higher abundance of the plant along the central and western aspect of the Imperial Sand Dunes. Figure 3.2-2 depicts the distribution and abundance of this species at the ISDRA.

Threats

OHV use and associated recreational development have been described as the primary threat to Peirson's milk-vetch through destruction of individual plants and habitat (Luckenbach and Bury, 1983; ECOS, 1990; Federal Register, 1998).

3.2.3.2 Algodones Dunes Sunflower *(Helianthus niveus* ssp. *tephrodes)*

Status

The Algodones Dunes sunflower was listed as endangered by the State of California in November 1979. It is recognized by the CNPS as 1B (rare, threatened, or endangered in California and elsewhere throughout their range).

Life History

The Algodones Dunes sunflower (also commonly referred to as the Algodones sunflower and the silver-leaved dune sunflower) is a perennial herb and native to California. A dense covering of fine hairs protects the plant from excess light and heat, (a common dune plant adaptation), and gives the leaves a silvery appearance (BLM, 1987). The Algodones Dunes sunflower is a relatively long-lived species; and, once established, it is able to survive periods of below-average precipitation. Felger (2000) reports that the species is 1.5 to over 3 feet tall, occasionally to 9 feet. Like Peirson's milk-vetch, Algodones Dunes sunflower has relatively large seeds and is fast growing.

Distribution and Occurrence within the Plan Area

The Algodones Dunes sunflower tends to grow in areas with active sand movement, such as on the lower portion of dune slip faces. The Algodones Dunes sunflower has been observed thriving where no other vegetation occurs on actively moving sand; but it also can be frequently associated with swales where concentrations of other vegetation are found (TOA, 2001).
Figure 3.2-3 depicts the distribution and abundance of this species at the ISDRA.

Threats

At the ISDRA, the primary threat to Algodones Dunes sunflower is destruction of individual plants and habitat by OHV use and associated recreational development.

3.2.3.3 Wiggins' Croton *(Croton wigginsii)*

Status
Wiggins' croton was recognized by the State of California as rare in January 1982 (CNDDB, 2001). It is also recognized by the CNPS as Category 2 (plants rare, threatened, or endangered in California, but common elsewhere in their range).

Life History
Wiggins' croton is a many branched, woody perennial which grows from 20 to 30 inches high.

Distribution and Occurrence within the Plan Area
This species is native to California, Arizona, and from Baja California and Sonora, Mexico. In the Imperial Sand Dunes it is found within psammophytic scrub habitat and prefers stabilized and partially stabilized desert dune systems (CNDDB, 2001). It most often grows on south or southeast slopes of basins, and sometimes grows farther toward the floor of the basin (TOA, 2001). Figure 3.2-4 depicts the distribution and abundance of this species at the ISDRA.

Threats
At the Plan Area, the primary threat to Wiggins' croton is destruction of individual plants and habitat by OHV use and associated recreational development.

3.2.3.4 Giant Spanish Needle *(Palafoxia arida* var. *gigantea)*

Status
The giant Spanish needle is recognized by the BLM as a sensitive species. The CNPS lists the giant Spanish needle as Category 1B (rare, threatened, or endangered in California and elsewhere throughout their range).

Life History
Giant Spanish needle is a fast-growing annual found on active sand dunes. This dune species tends towards gigantism, with larger and more robust plants than related nondune taxa (Felger, 2000). Felger (2000) reports it growing from 2 to 5 feet tall.

Distribution and Occurrence within the Plan Area
This species is native to California and is found from California to Arizona and in Sonora, Mexico (BLM, 1987; TOA, 2001). Once established, giant Spanish needle is able to survive periods of below-average precipitation. Abundance of giant Spanish needle in a given year is almost unrelated to the precipitation of the immediately preceding growing season (BLM, 2001a). As a short-lived flowering perennial, it frequently occurs within the Imperial Sand Dunes in sites with milk-vetch and croton (BLM, 2001a; TOA, 2001). Most of its occurrences were south of the large enclosure south of I-8 (TOA, 2001). Figure 3.2-5 depicts the distribution and abundance of this species at the ISDRA.

Threats

At the Plan Area, the primary threat to Algodones Dunes sunflower is destruction of individual plants and habitat by OHV use and associated recreational development.

3.2.3.5 Sand Food *(Pholisma sonorae)*

Status

This species is recognized by the BLM as a sensitive species. The CNPS lists this species as Category 1B (rare, threatened, or endangered in California and elsewhere throughout their range).

Life History

This parasitic, perennial herb is native to California. As a root parasite, most of the plant is buried in the sand and only the flower heads are visible aboveground. This species is parasitic on *Tiquilia plicata* and *Eriogonum deserticola* (Armstrong, 1980) and possibly also on *Croton wigginsii* (Westec, 1977). The point of connection with the host plant may be more than a yard below the surface. Sand food stems are succulent and store copious amounts of water. During times of drought, it may provide moisture to the host plant. It is visible aboveground for only a short time. Each spring, a flowering stem is sent to the surface by the sand food, which produces a disk-shaped inflorescence with hundreds of tiny pink flowers. Sand deflation does not seem to affect its flowering (TOA, 2001).

Distribution and Occurrence within the Plan Area

The primary habitat of sand food is open, sandy flats and sandy or stony desert washes within creosote bush scrub (CNDDB, 2001). Sand food was found at scattered locations during the TOA survey, most commonly in the Gecko Road area and the area just south of the large interim closure. It was generally in somewhat flat areas, but its appearance was difficult to predict, as there were many sites with hosts but without sand food (TOA, 2001). Figure 3.2-6 depicts the distribution and abundance of this species at the ISDRA.

Threats

At the Plan Area, the primary threat to sand food is destruction of individual plants and habitat by OHV use and associated recreational development. Additionally, impacts to host plants would have a negative effect on the sand food population (BLM, 2001a).

3.2.3.6 Relevant Reports

BLM Monitoring Report

In 1998, the BLM initiated monitoring of the six rare plant species. Monitoring was conducted in spring and summer 1998, spring 1999, spring 2000, and spring 2001. Results of the spring 2001 survey are not currently available. Utilizing the Westec study methodology (discussed later in this section), the dunes were divided into four geographic strata, 34 of the original 66 transects were randomly selected from those strata and divided into cells. Numbers of rare plants were then recorded within 10 to 15 meters or fixed parallel transects in each of the cells. Abundance classes were assigned for each species in a cell (BLM, 2000a). This report compared the responses of

the six rare plant species, as measured by abundance class data, over all 4 years of monitoring (1977 and 1998-2000). The study concluded that plants are at least as abundant and widespread in the entire dune system as they were in 1977. This report also noted that healthy populations of all six species remain in areas open to recreation, although the aboveground expression of populations of some of these species dramatically fluctuates with precipitation (BLM, 2001a).

The following is a species-by-species summary of the BLM monitoring study:

Peirson's milk-vetch. Abundance was closely tied to precipitation throughout the four years of monitoring. Species abundance was highest in 1998, second highest in 1977, third highest in 1999, and lowest in 2000. This mirrors the ranking of the four growing seasons in terms of average precipitation. Recruitment was possibly high in 1998 and low to nonexistent in 1999 and 2000. Responses of this species were similar in both the closed and open recreation areas across all 4 years of monitoring.

Algodones Dunes sunflower. Abundance increased significantly between 1977 and 1998. This increase is the result of a large increase in the values for the open area between 1977 and 1998. There were only slight decreases in abundance for 1999 and 2000. Between 1977 and 1998, the species declined in abundance in the closed area. This could be the result of lower recruitment of individuals into the population in the closed area. With the exception of 1977, the responses in the open and closed areas were parallel.

Wiggins' croton. Abundance in 1977 was about half of 1998. Abundance for 1999 and 2000 was similar to 1998. This increase may represent a real increase in the population size of this species in the dune system. Most of this increase was detected in the open area. Comparison of abundance in the closed and open areas indicate that except for 1977, when abundance was similar for both areas, the abundance for the rest of the years showed that open areas consistently had higher abundance.

Giant Spanish needle. Abundance was highest in 1998, the best rainfall year. However, abundance was second highest in 2000, the lowest rainfall season. The reason for the relatively high abundance in 2000 was unclear. Based on rainfall, it was expected that 1977 would have the second highest abundance. Instead, 1977 abundance ranked third and 1999 ranked last. The abundance between closed and open areas is very similar for 1977, 1998, and 1999, with 2000 having more abundance in the closed area. Data also appear to indicate that this species is more common in the northern part of the dunes, independent of whether the area is closed or open.

Sand food. Abundance increased between 1977 and 2000, with the highest abundance registered for 2000, the worst rainfall year. The reason for the relatively high abundance in 2000 was unclear. The second highest abundance was 1998, and 1999 abundance was very close to 1998. Abundance for this species in closed and open areas was the same for 1999. In 1998 and 2000, the values for the closed areas were higher than open areas. However, this

determination may have been due to a limitation in the survey method. In 1998, 1999, and 2000, transects were conducted on foot in the closed area, while those in the open area were run from a dune buggy. Additionally, in 1977, closed areas had lower abundance than open. This, too, may have been due to a limitation in the survey method. The 1977 survey utilized a helicopter in closed areas, not the ideal survey method to detect this cryptic plant.

Borrego milk-vetch. Abundance was essentially the same in 1977 and 1998. No plants at all were found in either 1999 or 2000, a statistically significant decline from 1998 and 1977 levels. Presumably, precipitation was insufficient for growth and establishment in 1999 and 2000. No comparison of abundance between closed and open areas was made because this taxon did not occur in the closed area.

Thomas Olsen and Associates Report

In 2001, the American Sand Association (ASA) retained the services of Thomas Olsen and Associates (TOA) to provide an independent assessment of the abundance, distribution, and life history of the Peirson's milk-vetch at the Imperial Sand Dunes. Additional distribution and abundance data were also collected on five other rare plants. As opposed to the BLM monitoring study, this study was designed to obtain an actual census of Peirson's milk-vetch. The other five plant species were also counted when they were observed with Peirson's milk-vetch. A nonprobabilistic survey was employed to determine areas for survey. As a first step in the survey methodology interviews of OHV users, BLM staff, and Border patrol officers who were familiar with the project area were conducted to determine locations of Peirson's milk-vetch. The second step included a general reconnaissance of the entire dune areas outside the interim closures and wilderness area. The third step consisted of actual intensive surveys of specific areas based on professional knowledge of habitat requirements of species, reconnaissance information, and feedback from the interviewees (TOA, 2001).

The team surveyed by foot and rail within the open areas. When a substantial number of plants was detected, the area was designated as a "site." A number was assigned to each site, and a team of two to three biologists conducted a census of the plants and recorded other habitat characteristics. Areas that were too small to circumscribe on a map or contained a small number of plants were designated as "points." Additionally, the team conducted an aerial survey by helicopter of the interim closure areas. Parallel transects or concentric circles of decreasing diameter were flown within each of the closure area boundaries south of SR-78 and a portion of the Algodones Dunes Wilderness Area north of the highway.

The survey produced a total of 61 sites and 66 points containing one or more of the rare plants within the dunes. Notable concentrations were found in several areas, which included: (1) the southern portion of the dunes near the international border and west of Buttercup Valley; (2) the area near Patton Valley, south of the large closure and west of the dune peaks; (3) between the

small central closure and the large central closure; and (4) the east side of the small central closure.

The general conclusion from this study was that the distribution of the rare plants is dependent on the geomorphology of the dunes, and they tend to be concentrated in areas where there is relative substrate stability. These are areas located generally on the lee side of the large dunes, in areas where the surface gradually slopes upwards from deep or shallow basins at the base of steep slipfaces. The study also concluded that less than 1 percent of the plants had been affected by OHVs (TOA, 2001).

The following is a species-by species summary of the TOA study:

Peirson's milk-vetch. A grand total of 71,926 individual plants was recorded. Occurrences were clustered in general areas, and no milk-vetch were detected in large portions of dunes. Generally, they were found west of the primary dunes in the open areas. The greatest number of plants found at a single site was 3,994 in the southern border area.

Algodones Dunes sunflower. This species was detected in 31 of 61 Peirson's milk-vetch sites, for a total count of 1,289, scattered throughout the primary dunes. The greatest estimated number of plants at a single site was 431 individuals.

Wiggins' croton. This species was found at 52 of 61 Peirson's milk-vetch sites for a total count of 3,614. They were found evenly distributed throughout the open areas, sharing generally the same habitat as the milk-vetch.

Giant Spanish needle. This species was found at 47 of 61 Peirson's milk-vetch sites for a total count of 4,191 individuals. Most of the occurrences were south of the Central Closure #2 and south of I-8.

Sand food. A total of 65 plants was found at nine scattered sites and points, most notably in the Gecko Road area and the area just south of Central Closure #2.

Borrego milk-vetch. The preferred habitat at the Plan Area for the Borrego milk-vetch, which is on the eastern portion of the dune system, was generally not surveyed during this study. However, a single site with 15 individuals was detected on the eastern edge of the dunes.

Westec Services, Inc. Report

The initial survey of rare plants in the Imperial Sand Dunes was carried out by Westec Services, Inc., under contract with the BLM in 1977. They surveyed for eight rare plants, of which seven were found. To determine species abundance, Westec surveyed 66 west-east, randomly selected parallel transects that were segmented into cells 0.45-mile per side (Westec, 1977). It must be noted that the Westec study was not specifically designed to study OHV impacts, and the conclusions are based on a single-year study. The study offered the following conclusions:

- Seedlings of rare species could not be found in "high impact areas," while seedlings of these species were abundant in other areas of the dunes.
- Intensity of OHV use in the dunes appears to be the key factor in impacting dune vegetation. Greatest impact occurs within the heaviest use areas.
- Lower level of "secondary impact" occurs throughout the dunes. However, this sporadic impact appears to decrease with increasing distance from the center of high impact areas.
- Despite the observed impacts, healthy reproducing populations of all rare plant species occurred within the dunes.

Luckenbach and Bury Report

In 1983, the Luckenbach and Bury study conducted at the Imperial Sand Dunes is perhaps one of the most significant studies that systematically addressed OHV impacts to the dune biota. However, the study has limited utility toward drawing conclusions with respect to rare plants since most of the study plots had none of these species in them. Another limitation is that the study compared sites with heavy OHV use to sites with no OHV use, which does not allow inferences to be made to less heavily used OHV sites. Also, what data were collected showed that Peirson's milk-vetch density and cover were actually higher in the OHV area than in the closed, control area. The following are the conclusions of this study:

- OHV activities in the dunes are highly detrimental to dune biota.
- Both herbaceous and shrubby perennial vegetation is reduced greatly in areas where OHVs operate.
- Most commonly, plants were destroyed by direct destruction or damage to root systems of psammophytic shrubs.
- Changes due to OHV impacts may result in substrate changes, such as compaction, reduced porosity, altered thermal structure, and reduced moisture content, although these effects were not tested.

ECOS, Inc. Report

In 1990, Ecos, Inc. was contracted by BLM to perform habitat characterization and rare plant species analysis as well as design a long-term monitoring plan. This study did not count the total number of plants; instead, they analyzed population fitness by scoring a set of variables for each species. This study concluded that substantially less vegetative cover and species diversity was observed. However, a limitation of this study is that it was conducted in a year of severe drought and study sites in the open OHV area were located relatively close to OHV staging areas. Therefore, the observations on OHV impacts to plant species do not apply to most of the OHV open area.

3.2.4 Special-Status and Endemic Wildlife Species

The designation of special-status includes federal- and state-listed species under either the federal or California ESA, species proposed for federal listing, federal candidate species, and species designated as sensitive by the California State Director of the BLM. The following special-status wildlife and endemic beetle species are known or may occur within the Plan Area. Therefore, these species may be affected by the planned action. Descriptions of these species are provided below.

3.2.4.1 Desert Tortoise *(Gopherus agassizii)*

Status

The Mojave population of the desert tortoise was emergency listed by the USFWS as an endangered species in 1989. Under final rule , the species was federally listed as threatened in 1990 (Federal Register, 1990). The State of California listed this species as threatened in 1989. The BLM recognizes the desert tortoise as a special-status species. Currently, the BLM is drafting several management plans including the West Mojave Coordinated Management Plan (WEMO), Northern and Eastern Mojave Coordinated Management Plan (NEMO), and Northern and Eastern Colorado Coordinated Management Plan (NECO) (BLM, 2001a). An important focus of these plans is the management of the Mojave population of the desert tortoise and its habitat on BLM lands in California. A final recovery plan was completed by the USFWS in 1994 for the Mojave population of the desert tortoise (USFWS, 1994). Critical habitat for the Mojave population was also designated by the USFWS in 1994 (Federal Register, 1994). The Chuckwalla Bench Critical Habitat Unit for this species is located less than 5 miles northeast of the ISDRA.

Life History

The desert tortoise is a large herbivorous terrestrial reptile. It has a high domed shell that may reach a length of 15 inches or more. This species has stocky, elephant-like limbs and a short tail. The carapace (upper shell) is brown; and the plastron (lower shell) is yellow in color, both exhibiting prominent growth lines. Adult males can be distinguished from females by the concavity in their plastron. Adult males also have larger chin glands and a longer tail and gular horn than females (Stebbins, 1985).

The adult desert tortoise is active from mid-March or April to November, and during the winter months is dormant in underground burrows (Luckenbach, 1982; Zimmerman et al., 1994). Desert tortoises will congregate in winter dens during colder weather, then spread out to nearby areas during moderate weather in the spring and fall and retreat into short individual burrows or under shrubs during more the extreme heat of the summer (Woodbury and Hardy, 1940). During the active period, desert tortoises may establish home ranges of approximately 1 square mile. Tortoises feed on a wide variety of herbaceous plants, including cactus, grasses, and annual flowering plants (USFWS, 1994).

Adult desert tortoises reach sexual maturity at 15 to 20 years of age. Mating occurs in the spring (April and May) and the fall (August and September) with nesting and egg laying occurring from May to July (Rostral et al., 1994). The female tortoise lays her eggs in a hole approximately 3 to 4 inches deep that is

dug near the mouth of a burrow. Following egg laying, the female covers the eggs with soil (Woodbury and Hardy, 1948). Clutch size ranges from 2 to 14 eggs with an average of 5 to 6 eggs (Luckenbach, 1982). Desert tortoise eggs typically hatch from August through October. These hatchlings are provided a food source in the form of an egg yolk that is assimilated into the underside of the shell. This yolk sac will sustain the animal for up to 6 months. The hatchling desert tortoise will go into brumation in the late fall, but can be active on warm sunny or rainy days.

Distribution and Occurrence within the Plan Area

The desert tortoise is widely distributed throughout the Mojave, Sonoran, and Colorado deserts. It occupies arid regions from southern Nevada and extreme southwestern Utah to northern Sinaloa, Mexico; southwestern Arizona west to the Mojave Desert and the eastern side of the Salton Basin, California (Stebbins, 1985).

In the Mojave region, desert tortoises are primarily associated with flats and bajadas with soils ranging from sand to sandy-gravel, but firm enough for the tortoise to construct burrows (USFWS, 1994). In California, the desert tortoise is most commonly found in association with creosote bush scrub with intershrub space for growth of herbaceous plants. However, it may also occur in saltbush scrub, desert wash, desert scrub, and Joshua tree woodlands. The desert tortoise is found from below sea level to elevations of 5,000 feet in California. The most favorable habitats occur at elevations of approximately 1,000 to 3,000 feet.

Desert tortoise habitat in the general vicinity of the ISDRA has been degraded and fragmented by OHV and camping use, agricultural development, utility corridors, and the construction and maintenance of the railroad and All American Canal. Along the eastern boundary of the ISDRA, the creosote bush scrub habitat and the desert washes north and south of SR-78 provide marginal suitable habitat for the desert tortoise. Desert tortoises have been observed by BLM and Border Patrol officials in the general vicinity crossing Vista Mine and Ted Kipf Roads. To date, surveys for desert tortoise have not been conducted at the ISDRA. Desert tortoise distribution and abundance data do not currently exist. The BLM proposes to conduct surveys to collect such data on this species at a latter date.

Threats

The decline in the desert tortoise population is attributed primarily to habitat loss, degradation, and fragmentation resulting from increased human population and urbanization in the desert and arid regions of the southwestern United States. The increase in urbanization, collection of tortoises for pets, overgrazing, landfills, subsidized predation, highway mortality, vandalism, agriculture, fire, drought, and OHV use all have contributed to the decline of the tortoise in the wild (Luckenbach, 1982; Federal Register, 1990). Another important reason for the decline of the desert tortoise is the introduction of an upper respiratory tract disease (URTD) into many of the wild populations

(Berry, 1986). This disease was thought to have been introduced through the illegal release of captive desert tortoises into the wild (USFWS, 1994).

3.2.4.2 Flat-tailed Horned Lizard (*Phrynosoma mcalli*)

Status

In California, the flat-tailed horned lizard was designated a sensitive species by the BLM in 1980. In 1988, a petition was submitted to the CFGC to list the species as endangered. In 1989, the commission voted against the proposed listing. In 1993, the USFWS published a proposed rule to list the flat-tailed horned lizard as a threatened species (Federal Register, 1993). No final rule on the proposed listing was issued. In 2001, the USFWS published a notice of reinstatement of the 1993 proposed listing of the flat-tailed horned lizard as a threatened species and reopened the comment period on the proposed rule (Federal Register, 2001). Currently, the State of California and BLM recognize the flat-tailed horned lizard as a species of special concern and special-status species, respectively.

Life History

The flat-tailed horned lizard has the typical flattened body shape of horned lizards. It is distinguished from other species in its genus by its dark ventral stripe, lack of external openings, broad flat tail, and comparatively long spines on the head (Funk, 1981). The flat-tailed horned lizard has two rows of fringed scales on each side of its body. The species has cryptic coloring, ranging from pale gray to light rust brown dorsally and white or cream ventrally with a prominent umbilical scar. The only apparent external difference between males and females is the presence of enlarged postanal scales in males. Maximum snout-vent length for the species is 3.3 inches (Muth and Fisher, 1992).

Flat-tailed horned lizards escape extreme temperatures by digging shallow burrows in the loose sand. Adults are primarily inactive from mid-November to mid-February. Juvenile seasonal activity is often dependent on temperature fluctuations. Breeding activity takes place in the spring with young hatching in late July and September. The diet of horned lizards typically consists of greater than 95 percent native ant species, mostly large harvester ants (*Pogonomyrmex* spp.).

Distribution and Occurrence within the Plan Area

The flat-tailed horned lizard is found in the low deserts of southwestern Arizona, southeastern California, and adjacent portions of northwestern Sonora and northern Baja. In California, the flat-tailed horned lizard is restricted to desert washes and desert flats in central Riverside, eastern San Diego, and Imperial Counties. The majority of the habitat for the species is in Imperial County (Turner et al., 1980).

The lizard is known to inhabit sand dunes, sheets, and hummocks, as well as gravelly washes. The species is thought to be most abundant in creosote bush scrub habitat. However, this species may also be found in desert scrub, desert wash, succulent shrub, alkali scrub, sparsely vegetated sandy flats, desert pavement, and rocky slopes. They are typically found in dry, hot areas of low elevation (less than 800 feet).

Suitable habitat for the flat-tailed horned lizard is found east of the project area from Ogilby Road and extending south to the All-American Canal (FERC, 2001). Monitoring conducted as part of the North Baja Pipeline Project in 2000 and 2001 detected flat-tailed horned lizard in this area (FERC, 2001). Rado noted that sand sheets extending east from the sand dunes provide favorable habitat for about 1 mile northwards from the intersection of Ogilby Road and I-8 (Rado, 1995).

The surveys conducted by the BLM in 1978, 1979, and 1980 reveal that the highest abundance of this species occurs southwest of the ISDRA in the East Mesa ACEC. Low abundance of this species was detected on the eastern and western boundaries of the sand dunes, predominantly in the creosote bush scrub habitat. Although this species is known to occur in the central Imperial Sand Dunes, the habitat is considered to be marginal because of the lack of suitable soil structure required to support their predominant prey: harvester ants (BLM, 2001b). Figure 3.2-7 depicts the distribution and abundance of this species at the ISDRA.

Threats

Human activities have resulted in the conversion of approximately 34 percent of the historic habitat of the flat-tailed horned lizard. The decline in the flat-tailed horned lizard population is primarily due to impacts from utility lines, roads, geothermal development, sand and gravel mining, OHV use, waste disposal sites, military activities, pesticide use, and Border Patrol activities (Foreman, 1997). Harvester ants, the horned lizards primary prey, are particularly sensitive and easily displaced by Argentine ants (UCSC, 2001). Currently, the Argentine ants (*Linepithema humile*), an invasive species, are moving up the California coastline with drastic effects on native ant species (Gordon, 1997). California harvester ants suffer undue losses and plants that depend on them for seed dispersal may also suffer. Horned lizard abundance is strongly correlated to the absence of Argentine ants and subsequent presence of native ant species, indicating that the Argentine ants are indirectly affecting the horned lizard population (UCSC, 2001).

3.2.4.3 Colorado Desert Fringe-Toed Lizard *(Uma notata)*

Status

The Colorado Desert fringe-toed lizard is a federal candidate for listing and State of California species of special concern. It is also recognized by the BLM as a sensitive species.

Life History

The fringe-toed lizard is a flattened, sand-dwelling lizard with characteristic fringed toes. The species is cryptic in color ranging from a sand color dorsally and white or cream ventrally. It also has pronounced dark lines on the throat, underside of the tail, and sides of the belly. The sides of the belly may also have vivid orange streaks especially during the breeding season. The only apparent external difference between males and females is the presence of enlarged postanal scales in males. Maximum snout-vent length for the species is 4.8 inches (Stebbins, 1985).

This species escapes extreme temperatures by digging shallow burrows in the loose sand deposits, often in primary and secondary dunes at the base of bushes in psammophytic and creosote bush scrub habitats. Adults are primarily inactive from mid-November to mid-February. Juvenile seasonal activity is often dependent on temperature fluctuations. Breeding activity takes place in the spring. This species primarily feeds on insects, but occasionally eats other lizards. They are also known to feed on buds, leaves, and flowers of plants.

Distribution and Occurrence within the Plan Area

The range of this species is from the vicinity of the Salton Sea and Imperial Sand Dunes, south across the Colorado River Delta to the Gulf of California and Tepopca Bay in Baja California. The fringe-toed lizard is largely restricted to fine, loose, wind-blown sand of dunes, flats, riverbanks, and washes. Vegetation is usually sparse, consisting of creosote bush or psammophytic scrub. The Colorado Desert fringe-toed lizard is known to occur within the Plan Area. To date, the BLM has conducted several surveys for fringe-toed lizards at the ISDRA. Figure 3.2-8 depicts the distribution and abundance of this species at the ISDRA.

Threats

Threats to Colorado fringe-toed lizard populations are to those described for the flat-tailed horned lizard.

3.2.4.4 Couch's Spadefoot Toad *(Scaphiopus couchi)*

Status

Couch's spadefoot toad is recognized by the State of California as a species of special concern and as a sensitive species by the BLM.

Life History

The Couch's spadefoot toad is distinguished from true toads by its cat-like eyes, single sharp-edged black spade on its hind foot, teeth in the upper jaw, and rather smooth skin. The pupils of this species are vertical in bright light and round at night. Couch's spadefoot toad is greenish yellow to brownish yellow with an irregular network of dark blotches dorsally and generally whitish ventrally. Males generally have a dusky throat, dark nuptial pads on the innermost front toes, and are often more greenish than the females. Their voice is a plaintive cry or groan, declining in pitch like the anxious bleat of a sheep (Stebbins, 1985).

They are generally active at night during spring and early summer rains and can be found in temporary desert rain pools with an insect food base available. Breeding is primarily from May-September during rainfall periods. They require friable soil for burrowing where they typically spend up to 11 months underground until sufficient rainfall has occurred.

Distribution and Occurrence within the Plan Area

The Couch's spadefoot toad occupies a variety of habitat types, including desert dry wash woodland, creosote bush scrub, desert riparian, palm oasis, desert succulent scrub, shortgrass plains, mesquite savannah, and alkali sink scrub. In California, the Couch's spadefoot toad occurs within Imperial,

Riverside, and San Bernardino Counties between 500 to 3,000 feet elevation. Scattered populations are known between Amos and Ogilby on the eastern boundary of the Imperial Sand Dunes. This species may occur in the microphyll woodland, desert dry wash, and creosote bush scrub habitats in the eastern portion of the Plan Area. To date, the BLM has not conducted any surveys for this species at the ISDRA. Therefore, Couch's spadefoot toad distribution and abundance data do not currently exist.

Threats

No specific threats to Couch's spadefoot toad are known. Potential threats to this species include loss, fragmentation, or degradation of habitat.

3.2.4.5 Gila Woodpecker (Melanerpes uropygialis)

Status

The Gila Woodpecker is listed as endangered by the State of California. It is also recognized by the BLM as a special-status species.

Life History

The Gila Woodpecker is a "zebra-backed" woodpecker. The males have a red cap on top of their head. The head and under parts are typically gray-brown. The Gila Woodpecker feeds mainly on insects, mistletoe berries, cactus fruits, corn; and occasionally contents of galls on cottonwood leaves, bird eggs, acorns, and cactus pulp. The species breeds from April through July, with peak activities in April and May. They are cavity nesters and may use abandoned owl cavities.

Distribution and Occurrence within the Plan Area

The Gila Woodpecker's preferred habitat is mesquite-dominated microphyll woodlands and desert dry washes. They also occupy orchard-vineyards (specifically, date palm groves) and urban areas (shade trees). This species was formerly prolific throughout the Imperial Valley. Due habitat degradation, most of the current populations are concentrated in the Brawley, California, area (CDFG, 2001). Brawley is located approximately 20 miles west of the Plan Area. At the Plan Area, this species may occur in the microphyll woodland habitat on the eastern side of the Imperial Sand Dunes. To date, the BLM has not conducted any surveys for this species at the ISDRA. Therefore, Gila Woodpecker distribution and abundance data do not currently exist.

Threats

Loss, fragmentation, or degradation of riparian woodland to development has displaced the woodpecker from some areas. Additionally, European Starlings are competing with this species for nest cavities (CDFG, 2001).

3.2.4.6 Burrowing Owl *(Athene cunicularia)*

Status

This species is recognized by the State of California as a species of special concern and as a sensitive species by the BLM.

Life History

This species of owl is identified by its barred and spotted plumage, white chin stripe, round head, and stubby tail. The Western Burrowing Owl is a diurnal

(daylight active) species that is nonmigratory in this portion of its range. Burrowing Owls are opportunistic feeders, preying upon arthropods, small mammals, birds, and sometimes reptiles and amphibians. This species breeds from late April through July in the Imperial Valley. Burrowing owls are subterranean nesters, typically found using burrows made by small mammals such as ground squirrels and badgers. The Burrowing Owl commonly perches on fence posts or on top of mounds outside its burrow.

Distribution and Occurrence within the Plan Area

Found throughout much of the western United States, this species inhabits open, dry grasslands, deserts, agricultural areas, and scrublands characterized by low growing vegetation. These owls also occupy open areas of airports, golf courses, and vacant urban lots. They are generally found at elevations ranging from 200 feet below sea level to 9,000 feet. Throughout the Imperial Valley, burrowing owls are frequently found along unlined agricultural canals and drainages. It is typically found in low densities in desert habitats, but can occur in much higher densities near agricultural lands where rodent and insect prey is more abundant. There are no known records of this species at the Plan Area. The psammophytic habitat is not suitable for this species. However, the creosote bush scrub and microphyll woodland habitats on the eastern boundary of the Imperial Sand Dunes are suitable for Burrowing Owls. To date, the BLM has not conducted any surveys for this species at the ISDRA. Therefore, Burrowing Owl distribution and abundance data do not currently exist.

Threats

Threats to this species include habitat degradation, disturbance to nesting and roosting sites, and pesticides and other contaminants/toxins. Agricultural practices that reduce the ground squirrel population result in a reduction of the available nesting and roosting sites for the Burrowing Owl.

3.2.4.7 LeConte's Thrasher (*Toxostoma lecontei*)

Status

This species is recognized by the State of California as a species of special concern and as a sensitive species by the BLM.

Life History

The LeConte's Thrasher is pale gray-brown in color, with a long tail, and recurved bill. They typically run before taking flight. LeConte's Thrashers feed on seeds, insects, small lizards, and other small vertebrates. This species requires areas with an accumulated leaf litter that serves as cover for its primarily arthropod prey. Only during breeding activities, when males sing from exposed perches, are they relatively easy to detect.

Distribution and Occurrence within the Plan Area

LeConte's Thrasher is a desert resident of areas with sparse desert scrub, alkali desert scrub, and desert succulent scrub habitats with open desert washes (CNDDB, 2001). It is found year-round throughout much of the Mojave and Colorado Deserts of California. Population densities of this species are among the lowest of passerine (perching) birds, estimated at less than five birds per square mile in optimum habitat. At the ISDRA, the

creosote bush scrub habitat and the desert washes on the eastern side of the Plan Area may provide suitable habitat for the LeConte's Thrasher. To date, the BLM has not conducted surveys for this species at the ISDRA. Therefore, LeConte's Thrasher distribution and abundance data do not currently exist.

Threats

OHV activity and other human disturbance are considered disruptive to this species, especially during the breeding season (late January to early June). OHV use can crush vegetation and destroy the underlying litter and soil surface thereby precluding heavily used sites from further use by this species (Sheppard, 1996).

3.2.4.8 Andrews' Dune Scarab Beetle *(Psuedocotalapa andrewsi)*

Likely endemic to the Imperial Sand Dunes, Andrews' dune scarab beetle is found primarily along the eastern edge of the dunes in the transitional zone between creosote bush scrub, psammophytic scrub, and microphyll woodland habitats. Little is known about the biology of this beetle. Current information about the distribution and preferred habitat at the Plan Area is not available (CNDDB, 2001). There are no confirmed host plants identified of the Andrews' dune scarab beetle. However, the adults of this species are known to swarm around creosote bushes, and may utilize the subsurface wet sand to regulate body temperature during the day (CNDDB, 2001). No information about threats to this species is available.

3.2.4.9 Carlson's Dune Beetle *(Anomala carlsoni)*

The Carlson's dune beetle is likely endemic to the Imperial Sand Dune system; however, there is limited information available about the microhabitat requirements or basic biology of this species (CNDDB, 2001). The adult beetle is known to be active at dusk, generally on north- or east-facing slip faces. Generally, it seeks the transitional zone between creosote bush scrub, psammophytic scrub, and microphyll woodland habitats. Although there is no known host plant, the adult beetle has been sifted (collected) from a wide variety of plants (CNDDB, 2001). No information about threats to this species is available.

3.2.4.10 Hardy's Dune Beetle *(Anomala hardyorum)*

Hardy's dune beetle is likely endemic to the Imperial Sand Dunes and is found primarily in the eastern portion of the ISDRA. The adult beetle is known to be active at dusk, generally on north- or east-facing slip faces. Generally, it seeks the transitional zone between creosote bush scrub, psammophytic scrub, and microphyll woodland habitats. The beetle also inhabits troughs of loose, drifting sand between the dune crests (BLM, 1987). Although there is no known host plant, the adult beetle has been sifted (collected) from a wide variety of plants (CNDDB, 2001). No information about threats to this species is available.

3.3 LAW ENFORCEMENT AND PUBLIC SAFETY

3.3.1 Regulatory Framework

United States Congress recognized that law enforcement on BLM-managed public lands was needed to ensure public safety and to protect resources. In 1976, BLM was given law enforcement authority with the passage of FLPMA. BLM law enforcement officers (LEOs) are responsible for protecting public safety and resources within the 264 million acres of BLM-managed public land in the U.S. BLM officers accomplish this in partnership with other federal, state, and local law enforcement agencies.

BLM El Centro law enforcement officers patrol the ISDRA, and are tasked with a variety of services, including:

- Educating the public on the rules and regulations
- Providing security at recreation sites
- Preventing theft of and damage to biological and cultural resources
- Assisting in emergency response situations
- Enforcing the rules and regulations through the issuing of warning and citations and, if necessary, by making arrests

BLM El Centro, Law Enforcement, enforce both state and federal regulations in the dunes. Current statistics for recorded incidents at ISDRA, as well as personnel and equipment available to BLM El Centro, Law Enforcement, to perform their tasks are discussed below.

3.3.2 Recorded Incidents

3.3.2.1 Emergency Response - Medical Aid and Fatalities

During the 2000-2001 Visitor Season, approximately 147 incidents that required medical aid to be provided occurred over the six major holiday weekends. This represents an average of 25 medical aid incidents per major holiday weekend. Based on an average of 55,000 visits per major holiday weekend (attendance can swell to over 100,000 visits during Thanksgiving weekend), approximately 1 reported medical aid incident occurs per 2,200 visitors. The number of fatalities averaged approximately one per busy holiday weekend during the 2000-2001 Visitor Season.

Table 3.3-1 lists a summary of documented medical aid responses and fatalities (1995 to 2001) provided by BLM El Centro, Law Enforcement. Records prior to 1995 are not available, and medical aid has not been fully documented over the years. The numbers shown in Table 3.3-1 do not capture each time aid was provided by BLM staff (BLM, 2001d).

Table 3.3-1 Documented Medical Aid Responses and Fatalities: 1995 to 2001 – Imperial Sand Dunes Recreation Area

YEAR	DOCUMENTED MEDICAL AID RESPONSES	DOCUMENTED FATALITIES
1995	165	0
1996	131	0
1997	210	5
1998	176	8
1999	151	5
2000	145	6
2001	147	8

Source: Hamada, 2001 – Personal Communication from Neil Hamada/BLM – El Centro to Elizabeth Cutler/CH2M HILL, October 30, 2001 – BLM unpublished data.

3.3.2.2 Citations and Arrests

During the 2000-2001 Visitor Season, approximately 3,530 citations/arrests occurred over the six major holiday weekends. On average, this represents approximately 588 citations and/or arrests per major holiday weekend or 1.1 citations/arrests per 1,000 visits. Based on an average of 29 law enforcement staff present over six major holiday weekends, each staff handled about 20 citations/arrests. The largest number of law enforcement incidents occur in Gecko Campground and Garbage Flats (BLM, 2001g).

Violation notices tracked by BLM El Centro, Law Enforcement, include the following categories:

- Registration
- Minor in Possession
- No Helmet
- Double Riding
- No Lights
- Resisting
- Open Container
- No Safety Flag
- Closed Area
- Vendor Permit
- Controlled Substance
- Use Fee
- Ride in Pickup Bed
- Natural Feature Destruction
- Speeding
- Possession of Marijuana
- Furnishing Alcohol to Minor
- Revoked License
- Dumping
- Glass Container
- Create Hazard
- Litter
- Concealed (Loaded) Firearm

Arrests tracked by BLM El Centro, Law Enforcement, include the following categories:

- DUI
- DUI/Felony Evade
- Assault
- Felony Evade
- Warrant
- Drugs
- Explosive Device
- Inciting Riot
- False Information
- Auto Theft
- Possession of Stolen Property
- Interference

Reports (including accidents) tracked by BLM El Centro, Law Enforcement, include the following:

- Assault
- Stolen Vehicle
- Weapon in Vehicle
- Drugs Seized
- Accidents
- Felony Hit and Run
- Child Endangerment
- Mexican Detainees
- Resisting Arrest
- Resisting Issuance
- Abandoned Vehicles
- Seized Marijuana
- Seized Marijuana/Paraphernalia
- Vehicles Towed
- Vehicles Seized
- Train Accidents

Table 3.3-2 provides a summary of violation notices, arrests, and reports (including accidents) that BLM El Centro LEOs issued for the six major holiday weekends during the 2000-2001 season.

Table 3.3-2 Total Violation Notices, Arrests, and Reports Including Accidents During Major Holiday Weekends: 2000-2001 – Imperial Sand Dunes Recreation Area

HOLIDAY WEEKEND	NUMBER OF INCIDENTS
Halloween – 2000	260
Thanksgiving - 2000	1,501
New Year's – 2001	409
Martin Luther King – 2001	191
Presidents Day – 2001	860
Easter – 2001	308

Source: BLM unpublished data, 2001.

3.3.3 Law Enforcement Personnel

BLM El Centro LEOs are "delegated" officers with the authority to arrest, carry a gun, and wear a badge; therefore, each officer must meet specific employment qualifications, which include:

- Graduate of a Law Enforcement Academy
- Emergency Medical Technician (EMT) certification or First Responder Training (minimum)

- State Peace Officer Authority certification (for state arrests through Imperial County) (required for sand dunes rangers)
- Specialized driver training (OHV training: vehicles/dune buggies/quadrunners) for primary operation in sand

The BLM, El Centro Field Office, has a staff of nine delegated LEOs (one Chief, one Supervisor, and seven Rangers) and one nondelegated LEO (trainee) who conduct regular patrols of the ISDRA. Patrol areas are designated as North Sand Dunes and South Sand Dunes. Various vehicles (e.g., quadrunners and dune buggies) are used to patrol the interior of the dunes to monitor OHV use. Most visitors stay within 1 mile of paved roads and the Sand Highway; however, with the increased use of global positioning system global positioning system (GPS) units, visitors are starting to venture further into the inner dunes (BLM, 2001h).

Additional staffing resources include BLM staff from other offices, as well as other federal and state agencies including National Park Service (NPS), USFWS, U.S. Border Patrol (USBP), California Highway Patrol (CHP), Imperial County Sheriff's Department, Imperial County Police Department, Brawley Police Department, El Centro Police Department, Calipatria Police Department, and Calexico Police Department. These additional resources are typically brought in over the six major holiday weekends (Halloween, Thanksgiving, New Year's, Martin Luther King, Presidents Day, and Easter). Some additional staffing resources are delegated law enforcement officers; others do not have the authority to arrest, but are capable of detaining individuals until delegated enforcement officers can arrive. Additional resources currently include up to 10 staff provided by the Imperial County Sheriff's office on a regular basis over major holiday weekends.

BLM El Centro, Law Enforcement, determined the number of LEOs needed for each holiday weekend (Year 2000-2001) to provide services for the ISDRA Plan Area (Table 3.3-3). Actual enforcement staff available (delegated and nondelegated personnel) over major holiday weekends is presented in Table 3.3-3. Data are available for 2000-2001 only.

A total of 172 law enforcement staff was present during the six major holiday weekends (not including 17 volunteer Boy Scouts) or an average of 29 law enforcement staff during each major holiday weekend (BLM, 2001d). On average, 19 law enforcement staff were provided during each busy holiday weekend in addition to the 10 permanent BLM staff. Assuming approximately 50 percent of all visits occur over the six major holiday weekends, approximately 1 law enforcement staff per 1,900 visits was provided. As noted in Table 3.3-3, the total number of LEOs needed approximates actual staff provided. However, without the 17 volunteer scouts, actual staff were around 10 percent below needed staff.

Table 3.3-3 Staffing Data for Holiday Weekends: 2000-2001 – Imperial Sand Dunes Recreation Area

HOLIDAY WEEKEND	NUMBER OF LEOS NEEDED[1]	ACTUAL STAFF AVAILABLE (DELEGATED AND NONDELEGATED)
Halloween – 2000	28	17
Thanksgiving – 2000	44	57[2]
New Year's – 2001	30	21
Martin Luther King – 2001	20	23
Presidents Day – 2001	36	52
Easter – 2001	30	19

[1]Per Bob Haggerty, BLM El Centro

[2]Includes 17 Scout team members

Source: BLM unpublished data, 2001

3.3.4 Public Safety Facilities and Equipment

The BLM, El Centro Field Office, has one permanent ranger station within the dunes area: Cahuilla Ranger Station is located on Gecko Road, within the most heavily visited area. The ranger station is open approximately 14 hours each day during holiday periods (approximately 20 days per year). On nonholiday weekends, the ranger station is open approximately 8 hours per day.

Additionally, during holiday weekends, two temporary contact stations are set up, one in Dunebuggy Flats and the other in the Buttercup areas. Law Enforcement shares facilities with the park rangers; there is no specific area reserved only for law enforcement use (including detention of serious violators).

The closest hospital to the North Dunes area is Pioneer Memorial, located in Brawley, approximately 35 miles from the ISDRA. The closest hospitals to the South Dunes area are Yuma Regional in Winterhaven, located approximately 10 miles from the ISDRA; and El Centro Regional Medical Center in El Centro, located approximately 20 miles from the ISDRA.

Currently, procedures vary for reporting incidences within the dunes. In particular, the first point of contact varies, and can include the ranger station, 911 (contacts Imperial County Sheriff Department, who then contacts a BLM ranger), and direct calls to Imperial County Sheriff Department (who then contacts a BLM ranger).

Safety equipment provided for the express use of BLM El Centro Law Enforcement is listed in Table 3.3-4. Those items with a zero quantity have been identified as an equipment need by BLM staff.

Table 3.3-4 BLM El Centro Law Enforcement Equipment – Imperial Sand Dunes Recreation Area

QUANTITY	ITEM	QUANTITY	ITEM
3	Pickup Trucks (4x4)	1	Dune buggy
7	SUVs (4x4)	6	Quad runners
6	ATVs	10	GPS Units
0	Law Enforcement Holding Facility	10	Cell phones
0	Facilities dedicated to Law Enforcement	10	Laptop computers
0	Equipment Garage Bay	0	Working radio communication system, with access to CLETS, NLETS, and NCIC[1]
1	Residential Facility separate from Station	$0.00	Law Enforcement Miscellaneous Supplies
1	Flat-bed dune buggy trailer	10	Radios, hand held
1	Enclosed dune buggy trailer	10	Radios, trucks/SUVs
0	911 call stations in Dunes campgrounds	0	Search and Rescue Equipment (including advanced-level life support system and automatic external defibrillators)

[1]California Law Enforcement Telecommunication System (CLETS), National Law Enforcement Telecommunication System (NLETS), and National Crime Information Center (NCIC)

Source: BLM unpublished data, 2001 – personal communication: Bob Haggerty/BLM El Centro Law Enforcement to Elizabeth Cutler/CH2M HILL, November 26, 2001g.

Additional equipment and materials available for use by BLM El Centro Law Enforcement from other departments at the BLM El Centro Office are listed in Tables 3.3-5, 3.3-6, and 3.3-7. Equipment and materials available from BLM El Centro, Recreation, are listed in Table 3.3-5; equipment available from BLM El Centro, Resources, are listed in Table 3.3-6; and equipment available from BLM El Centro, Maintenance, are listed in Table 3.3-7. Those items with a zero quantity have been identified by BLM staff as an existing equipment need.

Table 3.3-5 Equipment and Materials Available for use by BLM El Centro Law Enforcement (from BLM El Centro, Recreation) – Imperial Sand Dunes Recreation Area

QUANTITY	ITEM	QUANTITY	ITEM
2	Rescue buggies	0	911 call stations in dunes campgrounds
10	4X4's	40	Radios, hand held
1	Ranger Station / Interpretive Center	10	Radios, for trucks
0	Communication Center (FICC)	1	Phone lines
1 Bay	Garage bays for equipment	6	ATVs
1	Emergency Medical Services (EMS) clinic	12	GPS units
0	Holding facility	12	Cell phones
2	Residential facilities – separate from Station	1	Lap-top computers
1	Flat-bed dune buggy trailer	0	Working radio communication system w/dedicated channels
0	Helipads	0	Search and rescue equipment
1	Rescue trailers	0	Helicopter on standby
2	Camper trailers – portable Ranger Stations	0	Advanced-level life support program
$10,000/year	Medical supplies	0	Automatic external defibrillators

Source: Hamada, 2001 – Personal Communication from Neil Hamada/BLM – El Centro to Elizabeth Cutler/CH2M HILL, October 30, 2001d. BLM unpublished data.

Table 3.3-6 Equipment Available for use by BLM El Centro, Law Enforcement (from BLM El Centro, Resources) – Imperial Sand Dunes Recreation Area

QUANTITY	ITEM
2	Pickup truck(s) – 2x4
2	Pickup truck(s) – 4x4
1	Sport Utility Vehicle(s) – 2x4
3	Sport Utility Vehicle(s) – 4x4

Source: BLM, Fax from Roxie Trost/BLM El Centro (by Ray Romero) to Elizabeth R. Cutler/ CH2M HILL, November 5, 2001e. BLM unpublished data.

Table 3.3-7 Equipment Available for use by BLM El Centro, Law Enforcement (from BLM El Centro, Maintenance) – Imperial Sand Dunes Recreation Area

QUANTITY	ITEM	QUANTITY	ITEM
1	18-wheel Low Boy	1	Bobcat 843, plus attachments
1	16,000-gallon water tank	0	Backhoe (CASE 580 4-wheel drive or equivalent)
1	10-yard dump truck	1	Road grader
1	20-ton tilt equipment trailer	2	Stake bed trucks
1	CASE 821 Front-end Loader		
1	CASE 850 Bulldozer		

Source: Personal Telephone Communication, Steve Geyman/BLM El Centro, Maintenance, to Elizabeth R. Cutler/CH2M HILL, November 5, 2001e. BLM unpublished data.

3.4 SOCIOECONOMICS

3.4.1 Introduction

The ISDRA is located within Imperial County, California, near Yuma County, Arizona, to the east and the Mexican border to the south. For purposes of the socioeconomic analysis, the study area includes Imperial County, California, and Yuma County, Arizona.

This resource draws recreation visitors from major population centers including San Diego and Los Angeles, California, as well as Phoenix and Tucson, Arizona. However, the majority of the socioeconomic impacts associated with trips to the recreation area are assumed to stay within Imperial County where the dunes are located with some spillover occurring in Yuma County, Arizona. For example, residents of Imperial and, to a lesser extent, Yuma Counties gain employment and income from local expenditures by ISDRA visitors from outside the region. Only expenditures by nonlocal visitors represent injections of new dollars into the regional economy. Examples of expenditures that remain in these two counties are those relating to the purchase of supplies such as fuel, parts, food, camping supplies, and medication. For the larger capital items such as the recreational vehicles (RVs) and OHVs, it is assumed that the recreationists (duners) purchase these items from outside of Imperial and Yuma Counties. In addition to the creation of employment and income opportunities, residents of Imperial and Yuma Counties also benefit from the proximity to the recreation area.

The affected environment discussion for socioeconomics includes information on regional employment, income, finance, and demographic characteristics. Socioeconomic data are generally at the County level, and this section will describe the socioeconomic conditions at the county level for both Imperial and Yuma.

3.4.2 Imperial County, California

Imperial County occupies an area of 4,587 square miles in the southeastern corner of California. It is bounded on the north by Riverside County, on the west by San Diego County, on the south by Mexico, and on the east by the Colorado River and Yuma County, Arizona.

3.4.2.1 Population

The Plan Area lies within a sparsely populated, unincorporated area of Imperial County. The 2000 census indicated that Imperial County had a total population of 142,361 (California DOF-1, 2001). There are seven incorporated cities in the county, the three largest being El Centro, Calexico, and Brawley with populations of 37,835; 27,109; and 22,052, respectively. Seventy-seven percent of the County's inhabitants live in the incorporated areas. Table 3.4-1 shows the county and city populations for Imperial County. Although the county has experienced population growth since the 1990 census, the distribution of the population among the cities is estimated to be about the same in 2000 as it was in 1990.

Table 3.4-1 Imperial County/City Population Estimates

COUNTY/CITY	1990	1990 PERCENTAGE OF TOTAL	2000	2000 PERCENTAGE OF TOTAL
Brawley	18,923	17	22,052	15
Calexico	16,633	17	27,109	19
Calipatria	2,690	3	7,289	5
El Centro	31,405	29	37,835	27
Holtville	4,820	4	5,612	4
Imperial	4,113	4	7,560	5
Westmorland	1,380	1	2,131	1
Unincorporated	27,339	25	32,773	23
Incorporated	81,964	75	109,588	77
County Total	109,303	100	142,361	100

Source: California DOF-1, 2001

Based on the 2000 census data, approximately 72 percent of the population of Imperial County was classified as Hispanic. Whites were the next largest ethnic group at 20 percent of the population. The remaining 8 percent of the county population was classified as African American, Asian and Pacific Islander, American Indian, or Other (including those identifying two or more racial backgrounds). These percentages are comparable to the 1990 data as shown in Table 3.4-2.

Table 3.4-2 Imperial County Racial Profile

RACE	1990	1990 PERCENTAGE OF TOTAL	2000	1997 PERCENTAGE OF TOTAL
White	31,901	29	28,768	20.2
Hispanic	71,935	66	102,817	72.2
African American	2,272	2.1	5,148	3.6
Asian and Pacific Islander	1,632	1.5	2,521	1.8
American Indian	1,563	1.4	1,736	1.2
Other[a]			1,371	1.0
Total	109,303	100	142,361	100

Source: California DOF-2, 2001; 2000 U.S. Census

[a]The 2000 estimate for Others includes those identifying two or more racial backgrounds. Two or more racial background identification was not part of the 1990 Census.

3.4.2.2 Housing

According to estimates from the 2000 U.S. census, Imperial County had 43,891 housing units in 2000 with a vacancy rate of 10.3 percent. The number of households was 39,384 households with an estimated 3.6 persons per household (California DOF-3, 2001).

3.4.2.3 Employment and Income

The civilian labor force in Imperial County in 2000 was about 58,500. The average unemployment rate in the civilian labor force was 26.3 percent, compared to 4.9 percent for the State (California EDD, 2001). Historically, Imperial County has had one of the highest unemployment rates within the state, approaching 30 percent during the 1990s. The primary employment sectors in the county are the government, agriculture, trade, and service. Table 3.4-3 shows the major employment sectors for 2000.

The agriculture and government sectors are the dominant sectors in the county providing approximately one in two jobs. The bulk of the other jobs is in the trade (both wholesale and retail) and services sectors. Retail trade employs 8,300 people and accounts for 16.7 percent of the industry employment. Services employ 5,700 and account for 11.4 percent of the industry employment.

The per capita income for Imperial County in 1999 was $17,550, one of the lowest in California and well below the state average of $29,856 (California DOF-4, 2001). Median family income for 1990 (the 2000 Census estimates on income are expected to be released in April 2002) was estimated at $25,147. The percent of person below the poverty level in 1990 was 23.8 percent compared to 12.5 percent for the state (California DOF-5, 2001).

Table 3.4-3 Summary of Imperial County Employment Data, 2000

	EMPLOYMENT NUMBERS	PERCENTAGE OF TOTAL
Agriculture	11,300	22.7
Construction and Mining	2,100	4.2
Manufacturing	1,900	3.8
Transportation and Public Utilities	1,900	3.8
Wholesale Trade	2,100	4.2
Retail Trade	8,300	16.7
Finance, Insurance and Real Estate	1,100	2.2
Services	5,700	11.4
Government:	15,500	31.1
Federal Government	1,800	3.6
State and Local Government	13,700	27.5
Total Industry Employment	49,800[a]	100.0

Source: California EDD, 2001.

[a]Difference in totals is due to the differences in labor force and employment-by-industry data.

3.4.2.4 Finance

Taxable retail sales in Imperial County was $871.2 million in 1999 (California DOF-6, 2001). This represents about 0.3 percent of total state retail sales. The sales tax rate in the county is 7.5 percent.

3.4.3 Yuma County, Arizona

Yuma County occupies an area of 5,522 square miles in the extreme southwest corner of Arizona. It is bordered by the Colorado River and Imperial County, California, on the west and Mexico on the south.

3.4.3.1 Population

The 2000 census indicated that Yuma County had a total population of 160,026 (Census, 2000). There are seven incorporated cities in the county, the three largest being Yuma, Fortuna Foothills CDP, and San Luis with populations of 77,515; 20,478; and 15,322, respectively. Sixty-four percent of the inhabitants of the county live in the incorporated areas. In Yuma County, the City of Yuma is the population center nearest to the Plan Area. Recreationists from the Phoenix, Arizona, area stop at the City of Yuma to stock up on most of the supplies for their visits to the ISDRA. Table 3.4-4 shows the county and city population for Yuma County.

Table 3.4-4 Yuma County/City Population Estimates

COUNTY/CITY	1990	1990 PERCENTAGE OF TOTAL	2000	2000 PERCENTAGE OF TOTAL
Fortuna Foothills CDP	7,737	7.2	20,478	12.8
Gadsden CDP	NA	NA	953	0.6
San Luis City	4,212	3.9	15,322	9.6
Somerton City	5,282	4.9	7,266	4.5
Tacna CDP	NA	NA	555	0.3
Wellton town	1,066	1.0	1,829	1.1
Yuma City	54,923	51.4	77,515	48.4
Unincorporated	41,412	38.7	58,094	36.3
Incorporated	65,483	61.3	101,932	63.7
County Total	106,895	100	160,026	100

Source: Arizona DES-1 and DES-2, 2001
NA = Not available

Hispanics comprise the largest racial group accounting for 50.5 percent of the 2000 population of the county. Whites are the second largest racial classification comprising 44.3 percent of the population, while the remaining racial classification of African American, Asian and Pacific Islander, and American Indian comprise approximately 2.0, 0.9, and 1.1 percent of the population, respectively. Table 3.4-5 summarizes the racial profile of Yuma County with a comparison to 1990 data. As the data indicate, the number of Hispanics has increased from about 40 percent of the population of the county in 1990 to about 51 percent in 2000. This increase in the percentage of Hispanics has been accompanied by a decrease in the White population from 54.4 percent in 1990 to 44.3 percent in 2000.

Table 3.4-5 Yuma County Racial Profile

RACE	1990	1990 PERCENTAGE OF TOTAL	2000	1997 PERCENTAGE OF TOTAL
White	58,151	54.4	70,956	44.3
Hispanic	43,388	40.6	80,772	50.5
African American	2,776	2.6	3,136	2.0
Asian & Pacific Islander	1,188	1.1	1,494	0.9
American Indian	1,178	1.1	1,819	1.1
Other	214	0.2	1,849	0.2
Total	106,895	100	160,026	100

Source: Arizona DES-3, 2001 and Arizona DES-4, 2001

3.4.3.2 Employment

The average civilian labor force in Yuma County in 2000 was about 65,700. The average unemployment rate in the civilian labor force was 27.5 percent compared to 3.9 percent for the state (Arizona DES-5, 2001). The primary employment sectors in the county are the government, trade, and services. Table 3.4-6 shows the major employment sectors for 2000.

Table 3.4-6 Summary of Yuma County Employment Data, 2000

	EMPLOYMENT NUMBERS	PERCENTAGE OF TOTAL
Agriculture	7,475	15.7
Construction and Mining	2,750	5.8
Manufacturing	2,200	4.6
Transportation and Public Utilities	1,550	3.3
Trade	11,250	23.6
Finance, Insurance and Real Estate	1,325	2.8
Services	9,625	20.2
Government:	11,425	24.0
Federal Government	2,075	4.4
State and Local Government	9,350	19.6
Total Industry Employment	47,600[a]	100.0

Source: Arizona DES-5, 2001.

[a]Difference in totals is due to the differences in labor force and employment-by-industry data.

The government, trade, and services sectors are the dominant sectors in the county providing one out of every three jobs. The government sectors (federal, state, and local) employ 11,425 people (about 24 percent), whereas the trade sectors employ 11,250 people (about 24 percent). The services sector employs 20.2 percent (or 9,625) of the labor force.

3.4.3.3 Income

The per capita income for Yuma County in 1999 was $18,452 ranking 10th out of the 15 counties in Arizona. The average per capita income for the state was approximately $25,173. Median family income for 1990 (the 2000 census estimates on income are expected to be released in April 2002) was estimated at $23,635 (Arizona DES-6, 2001). In 1990, the poverty rate stood at 19.9 percent, a figure that is more than the state average of 15.7 percent (Arizona DES-7, 2001).

3.4.3.4 Finance

Taxable retail sales in Yuma County was $780 million in 1999. (Smith, 2002). This represents about 2 percent of total state retail sales. The sales tax rate in the county in 1999 was 7.10 percent (Heugly, 2002).

3.5 LAND USE AND LAND OWNERSHIP

3.5.1 Regional Setting

The ISDRA is located in southeastern California, in Imperial County, a county that extends over 4,597 square miles, bordering on Mexico to the south, Riverside County to the north, San Diego County on the west, and the State of Arizona on the east. Although lying in the desert east of the Peninsular Range of Southern California, the availability of irrigation water from the Colorado River has made possible a substantial agricultural economy in Imperial County. Approximately one-fifth of the land in the county is irrigated for agricultural purposes, while about half of county lands are largely undeveloped and under federal ownership. There are seven incorporated cities within Imperial County: Brawley, Calexico, Calipatria, El Centro, Holtville, Imperial, and Westmorland. These incorporated cities, as well as the unincorporated communities and supporting facilities, occupy less than 1 percent of the land in the county.

The Imperial Sand Dunes, also referred to as the Algodones Dunes, extend from central Imperial County more than 40 miles into the southeastern portion of the county. The dunes and associated sand sheets generally form the eastern boundary of the agricultural area of Imperial Valley. The dunes themselves form a band averaging 5 miles in width. The ISDRA itself is roughly bordered on the west by the Coachella Canal, which delivers Colorado River water to the fertile agricultural valley to the north and west. A major east-west route of the UPRR skirts the eastern edge.

The dune system, extending from northwest to southeast, is crossed by two major east-west highways, near which recreational use traditionally has been concentrated. To the north, SR-78 crosses at the small settlement of Glamis, and connects Brawley (29 miles west of Glamis) with Blythe (60 miles northeast of Glamis). At the south end of the recreational area, I-8 crosses the dunes in the Buttercup Valley area. This highway provides access from El Centro and Southern California to the west, and from Yuma and the urban centers of Arizona to the east.

The ISDRA Plan Area includes not only the most of the sand dunes system, but also adjacent sand sheets to the west, and dissected distal alluvial fans to the east. Land use patterns (excluding recreational use) are less constrained than they are in the sand dunes themselves. These adjacent lands include the area east of Glamis along Ted Kipf Road and the UPRR to the east, and the East Mesa Area including the land between the Old Coachella Canal and the New Coachella Canal.

For management and reference purposes, the ISDRA has been generally divided into three areas. The northern-most area is known as Mammoth Wash. South of Mammoth Wash is the North Algodones Dunes Wilderness, which was established by the 1994 California Desert Protection Act. This area is closed to mechanized use and is accessible only by hiking and horseback. The largest and most heavily used area for OHV recreational

purposes is south of the wilderness, beginning at SR-78 and continuing south beyond I-8 to the border with Mexico.

3.5.2 Regulatory Framework

Plans and policies applicable to the management and ownership of any parcel or right-of-way depend upon the agency responsible for managing the lands involved. Primarily, the lands within the ISDRA are public lands managed by the BLM. The governing laws and applicable land management plans for these lands are the:

- Federal Land Policy and Management Act of 1976 (P.L. 94-579, as amended)
- California Desert Protection Act of 1994 (P.L. 103-433)
- BLM California Desert Conservation Area Plan of 1980, as amended

Lands under private ownership exist within and adjacent to the Plan Area boundary. Applicable land management plans and policies for these lands include:

- The Imperial County General Plan
- Imperial County Zoning Regulations

Two parcels of land owned by the California State Lands Commission (CSLC) lie within the ISDRA Plan Area. CSLC does not actively manage these parcels.

3.5.2.1 Federal Land Policy and Management Act of 1976, As Amended

In 1976, Congress enacted the FLPMA and established the 25-million-acre CDCA. FLPMA was enacted to direct the management of the public lands of the United States, including the 12 million acres of public lands within the CDCA. Section 601 of FLPMA required BLM to develop a plan to "...provide for the immediate and future protection and administration of the public lands in the California Desert within the framework of a program of multiple use and sustained yield, and the maintenance of environmental quality." The CDCA Plan, discussed in more detail below, was created to establish guidance for the management of the public lands of the California Desert by the BLM, including the ISDRA.

Congress, in Section 102(a)(7) of the Federal Land Policy and Management Act of 1976, declared that the public lands included in the Act were to be managed "on the basis of multiple use." FLPMA defines multiple use as "... the management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and condition;...." The definition goes on to allow some areas to be managed for "...less than all the resources; a combination or balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources..." (Section 103(c)).

3.5.2.2 California Desert Protection Act of 1994

The CDPA established 69 wilderness areas located on BLM-managed public lands. In its findings for the CDPA, Congress declared that (1) wilderness is a distinguishing characteristic of the public lands in the California desert, (2) the wilderness values of desert lands are increasingly threatened by activities and intrusions associated with incompatible use and development, and (3) the preservation of desert wilderness requires the highest forms of protective designation and management. The CDPA established the North Algodones Dunes Wilderness, located in the northern portion of the ISDRA Plan Area, beginning just north of SR-78, and ending just at the Mammoth Management Area (see Figure 1-2). This enhanced the multiple-use aspect of the ISDRA by assuring primitive, nonmotorized recreational experiences would be available along with motorized recreational activities in other parts of the ISDRA.

3.5.2.3 California Desert Conservation Area Plan

The CDCA Plan is a comprehensive, long-range plan for the use and management of the 12 million acres of public land within the boundaries of the California Desert Conservation Area. The CDCA Plan was adopted in 1980, and subsequently has been amended on a periodic basis. The goal of the CDCA Plan is to provide and enhance uses for public lands without diminishing the environmental, cultural, and aesthetic values of these lands (BLM, 1980).

The ISDRA is located entirely within the CDCA. The majority of the public lands within the CDCA has been designated under a multiple-use classification system. The CDCA Multiple-Use Classes are discussed in Section 3.1 and illustrated in Figure 3.1-1.

All four MUCs are represented within the ISDRA. The North Algondones Dunes Wilderness is located within lands designated Class C. The CDCA Plan assigned much of the central dunes and Pilot Knob Mesa on the eastern edge of the dunes to Class L, to protect sensitive plant and wildlife habitat. East Mesa south of SR-78, the area east of Glamis, and South Ogilby Dunes were placed in Class M. Class I areas within the ISDRA include the intensively used OHV activity areas such as those near Glamis, along the Gecko Road, and Buttercup Valley. The management objective of these areas is to enhance opportunities for OHV recreation.

In addition to MUCs, the CDCA also designated ACECs, areas where special management attention is required to protect and prevent damage to important natural and cultural resources. At the ISDRA, these include Plank Road ACEC and the East Mesa ACEC near Gordons Well. The former was designated an ACEC to protect this historic resource, and the latter was designated to ACEC to protect habitat of the flat-tailed horned lizard.

3.5.2.4 Imperial County General Plan and Zoning Regulations

As Imperial County has no direct land use jurisdiction over public lands, neither the General Plan nor the Imperial County zoning regulations are directly applicable to activities proposed on public lands. However, private lands scattered throughout and adjacent to the Plan Area are under the jurisdiction of Imperial County.

The state-mandated Imperial County General Plan (General Plan) was developed to create a balanced, comprehensive guide for future physical growth of lands within the county, and to provide mechanisms to achieve the desired goals and objectives of the county. The General Plan strives towards achieving a balance between development and economic, social, and environmental resources. The General Plan consists of nine elements: Land Use, Housing, Circulation and Scenic Highways, Noise, Seismic and Public Safety, Agriculture, Conservation and Open Space, Geothermal and Transmission Resources, and Water Resources (Imperial County, 1993).

A land use map that depicts existing and projected land use development patterns within Imperial County is provided as part of the Land Use Element of the General Plan (Land Use Plan). The Land Use Plan indicates that the ISDRA and vicinity, including both public- and privately-owned lands, are located within a larger area currently zoned "S-2, Open Space Preservation," with the exception of some small, scattered parcels of land zoned S-1 (Open Space Recreation) or C1-PE (Neighborhood Commercial, Pre-existing). The Conservation and Open Space Element of the Plan is concerned with open space and other environmental resources. The purpose of the Conservation and Open Space Element of the General Plan is to:

- Promote the protection, maintenance, and natural resources of the county with particular emphasis on scarce resources and resources that require special control and management
- Prevent the wasteful exploitation, destruction, and neglect of the natural resources of the state
- Recognize that natural resources must be maintained for their ecological value as well as for the direct benefit to the public
- Protect open space for the preservation of natural resources, the managed production of resources, outdoor recreation, and public health and safety

The General Plan provides for the preparation and adoption of specific plans as "planning tools" to implement the general plan for further studies as needed prior to development. Two specific plan areas are in the immediate vicinity of the ISDRA. The boundaries of the 8,960-acre Felicity Specific Plan Area approach the ISDRA from the west. This Plan Area is intended to be developed with a full range of residential, commercial, and light industrial uses in a manner compatible with the natural setting of the site and its visibility from I-8. The Felicity Specific Plan is currently in litigation and has not been approved (Imperial County, 2001a). The Glamis Specific Plan Area is approximately 160 acres and is located just inside the eastern boundary of the ISDRA at SR-78. The Glamis Specific Plan Area is intended to accommodate recreation-supporting land uses including retail and service commercial, motel accommodations, recreational vehicle and mobile-home parks, and community facilities. Except as needed for onsite employees, the Glamis Specific Plan does not include use areas for permanent occupancy.

3.5.3 Land Ownership and Rights-of-Way

A mixed ownership pattern, with public land managed by the BLM comprising most of the land, exists within the ISDRA planning area (Figure 3.5-1). In addition to a limited number of parcels in private ownership as well as lands withdrawn for other federal use (such as that by the Department of Defense or the Bureau of Reclamation), under FLPMA the BLM has granted a number of rights-of-way for facilities within the ISDRA (Table 3.5-1).

Table 3.5-1 Rights-of-Way And Other Entitlements Within The ISDRA Planning Area

MAMMOTH MANAGEMENT AREA
1. Cathodic Protection Unit Site R/W (LA 0158160)
2. BLM Windmill and Wildlife Water Tank Sites (2) R/W (CA-8714)
NORTH ALGODONES MANAGEMENT AREA
1. BLM Windmill and Wildlife Water Tank Site R/W (CA-8714)
2. State Route 78 R/W (CA-14630)
3. Military Target Area (R 05657)
GECKO MANAGEMENT AREA
1. Military Target Area (R 05657)
2. Old Coachella Canal R/W (LA 056654)
3. Withdrawal Yuma Reclamation Project - New (Realigned) Coachella Canal
4. BLM (Gecko Road) Easement (CA-2551)
5. Glamis Known Geothermal Resource Area (CA-17575)
6. Fiber Optic Line (AT&T) R/W (CA-41690)
7. Underground Telephone Line R/W (CA-19125)
8. Temporary Use Permits for Apiary Sites along Coachella Canal
9. WSA CDCA 362 - South Algodones Dunes
GLAMIS MANAGEMENT AREA
1. Underground Telephone Line R/W (CA-19125)
2. Road R/W (CA-40791)
3. State Route 78 (Realigned portion) R/W (CA-17922)
4. Fiber Optic Line (AT&T) R/W (CA-41690)
ADAPTIVE MANAGEMENT AREA
1. Military Target Area (R 05657)
2. Cathodic Protection Unit Site R/W (LA 0158161)
3. Glamis Known Geothermal Resource Area (CA-17572)
4. WSA CDCA 362 - South Algodones Dunes
DUNE BUGGY FLATS MANAGEMENT AREA
1. All American Canal R/W (LA 077775)
2. Proposed Withdrawal, All American Canal Lining Project (CA-34475)
3. Old Coachella Canal R/W (LA 056654)
4. Withdrawal Yuma Reclamation Project - New (Realigned) Coachella Canal
5. Military Target Area (R 05657)
6. Temporary Use Permits for Apiary Sites along Coachella Canal

Table 3.5-1 Rights-of-Way And Other Entitlements Within The ISDRA Planning Area

OGILBY MANAGEMENT AREA
1. Interstate 8 Highway R/W (LA 0165008)
2. State Highway (Grays Well Overpass) R/W (CA-17911)
3. Transmission Line R/W (LA 055613)
4. Transmission Line R/W (CA-5865)
5. County Road (Ogilby) R/W (CA-19171)
6. Communication Site, Access Road and Transmission Line R/W (CA-17182)
7. Railroad R/W (east boundary of management area)
8. All American Canal and Well Sites R/W (LA 077775)
9. Proposed Withdrawal, All American Canal Lining Project (CA-34475)
BUTTERCUP MANAGEMENT AREA
1. Utility Corridor J (2 miles wide)
2. All American Canal and Associated Telephone and Transmission Line R/W (LA 077775)
3. Transmission Line R/W (CA-5865)
4. Transmission Line R/W (CA-18904)
5. Transmission Line R/W (LA 055165)
6. Transmission Line R/W (LA 0164553)
7. Powerline Extension (to All American Canal) R/W (CA-35934)
8. Underground Telephone Line R/W (CA-26357)
9. Underground Fiber Optic Line (Level 3) R/W (CA-41192)
10. Barrier (U.S. Border Patrol) R/W Reservation (CA-34052)
11. Road (Grays Well Road) R/W Reservation to BLM (CA-19131)
12. Interstate 8 Highway R/W (LA 0165008)
13. State Highway (Grays Well Overpass) R/W (CA-17911)
14. Interstate 8 Highway and Ancillary Facilities R/W (R 07237)
15. Interstate 8 Highway and Ancillary Facilities R/W (R 01737)
16. Proposed Withdrawal, All American Canal Lining Project (CA-34475)
BUFFER MANAGEMENT AREA
1. Strip of Land Acquired by and Under Jurisdiction of BOR (CA-19902)
2. Old Coachella Canal R/W (LA 056654)
3. Underground Fiber Optic Line (AT&T) R/W (CA-41690)
4. Cathodic Protection Unit Site R/W (LA 0158162)
5. State Route 78 (Realigned Portion) R/W (CA-17922)
6. Railroad Spur R/W (CA-29617)
7. Mineral Material Site (LA 0164722)
8. Cathodic Protection Unit Site R/W (R-374)
9. Easement to U.S. for Gordons Well Road (CA-37234)
10. Barrier (U.S. Border Patrol) R/W Reservation (CA-34052)
11. County Road (Old Hwy. 80) R/W (R 01737)
12. Underground Telephone Line R/W (CA-26357)
13. Road R/W (LA 0165008)

Table 3.5-1 Rights-of-Way And Other Entitlements Within The ISDRA Planning Area

14. All American Canal, Telephone Line R/W (LA 077775)
15. Transmission Line R/W (LA 055165)
16. Transmission Line R/W (LA 164553)
17. County Road (Old Hwy. 80) R/W (R 01737)
18. Road, Pipeline, Wells, Transmission Line (CA-21618)
19. Mineral Material Site (LA 0133909)
20. RS 2477 County Road (Vista Mine Road and Zappone Road) R/W (CA-19169)
21. State Highway (Portion of Hwy. 78) R/W (CA-14630)
22. Underground Telephone Line R/W (CA-19125)
23. Road R/W (CA-8503)
24. Road R/W (CA-40791)
25. All American Canal R/W (LA 077775)
26. Seismographic Monitoring Site R/W (CA-2953-22)
27. Transmission Line R/W (CA-5865)
28. Underground Fiber Optic Line (Level 3) R/W (CA-41192)
29. State Highway R/W (R 137)
30. Surveillance Camera and Access Road (U.S. Border Patrol) R/W Reservation (CA-40000)
31. Telephone Line and Road R/W (CA-18904)
32. Temporary Use Permits for Apiary Sites along Coachella Canal

R/W – Right-of-way

As with other BLM-administered lands, rights-of-way and temporary use permits within the ISDRA are normally granted subject to other valid, pre-existing rights including the right of entry unless specifically prohibited. Rights-of-way, temporary use permits, and other similar entitlements are normally not granted if the use for which the right of way is intended would conflict with a valid pre-existing use. Thus, OHV recreational activities still occur on utility rights-of-way within the ISDRA. Entry into lands that have been withdrawn or reserved, on the other hand, is normally precluded for purposes other than those intended for the withdrawal or reservation. Hence, public entry is prohibited in the military areas noted above.

While most Bureau of Reclamation (BOR)-withdrawn lands have been relinquished within the ISDRA, some of the lands around the U.S. Navy East Mesa Target Area and between the Old and New Coachella Canals remain withdrawn. Under terms of a 1978 agreement, BLM has recreation management responsibility for these lands but must obtain BOR concurrence on all management actions. In addition, BOR retains a withdrawal on the rights-of-way of the new Coachella Canal and All-American Canal (1,000 feet on either side of the canal centerline). BOR must approve BLM management programs initiated within the canal rights-of-way. BOR programs are the paramount use on all BOR-withdrawn lands.

3.5.4 Existing Land Uses

Existing land uses at the ISDRA are primarily recreational, although agricultural, transportation, communication, military, and other uses also occur. Multiple-use classes, as defined in the CDCA Plan (see above), are used to guide land use in the ISDRA; those uses are discussed below. The CDCA Plan also identifies certain areas within the ISDRA as open, limited, or closed to OHV use. Detailed discussions of existing recreational uses in the ISDRA, including OHV uses and camping, are provided in Section 3.1 (Recreational Resources).

3.5.4.1 Recreational Use And Multiple-Use Classes Within the ISDRA

Lands located within the ISDRA have been assigned to an MUC that defines permitted uses on those lands. Land uses currently occurring within each MUC are described below and are primarily recreation based. Areas with restricted vehicle use or that are open or closed to OHV use are discussed as they occur within each MUC.

Class C

Lands identified as Class C make up the 32,000-acre North Algodones Dunes Wilderness, as created by Congress through the California Desert Protection Act of 1994. Solitude and primitive recreation are the primary land uses within the wilderness. Primitive camping is allowed, but developed camping sites or facilities are not available. No commercial uses are permitted, and the use of motorized vehicles of any kind is prohibited.

Most use in the wilderness takes the form of short photographic and sightseeing walks from SR-78, although hiking, backpacking, and nature study trips also occur. The wilderness is closed to OHV use (see Figure 3.1-2).

Class L

Lands identified as Class L (Limited Use) make up most of the southern half of the ISDRA, including much of the central dunes and Pilot Knob Mesa. Limited Use lands are intended to protect sensitive natural, scenic, ecological, and cultural resource values. This class is suitable for recreation that generally involves low to moderate user densities. Developed campgrounds or sites involving concentrated recreational use are generally not allowed in this class. Most of the central dunes Class L area is lightly used, with use consisting primarily of OHV day use with little camping. However, the Ogilby Camp Area is located in Class L lands in the southeastern portion of the ISDRA.

Class M

Class M (Moderate Use) lands are located along the eastern and southern boundaries of the ISDRA and west of Glamis along SR-78. These lands are intended to provide for a balance between higher intensity use and protection of public lands. Recreational use is appropriate at moderate to high densities, and developed recreation sites are permitted. The Class M lands east of Glamis are currently closed to camping. OHV use on Class M lands is limited to approved routes of travel.

Class I

Class I (Intensive Use) lands provide for the concentrated use of lands and resources to meet human needs. Recreation activities involving high densities

are permitted. Areas of the dunes assigned to Class I include the intensively used OHV areas around Glamis, Buttercup Valley, and Mammoth Wash. The management objective of these areas is to enhance opportunities for OHV recreation. Campgrounds and other facilities are permitted.

High-density camping and OHV uses occur in Class I. Many established campgrounds are located along SR-78, Gecko Road, and I-8. These campgrounds are used primarily by those participating in OHV activities on Class I lands. The Class I lands immediately south of SR-78 are the most intensively used. Also intensively used is the Buttercup Valley Class I area, which is located just north and south of I-8. The Class I area near Mammoth Wash at the north end of the ISDRA receives only light-to-moderate use, owing largely to difficulty in accessing it.

3.5.3.2 Nonrecreational Land Uses

Some BLM-managed land within the ISDRA has not been assigned an MUC. These lands are located along the east side of the ISDRA and parallel the UPRR, as well as additional lands east and north of Glamis. Generally, they were recognized in the CDCA Plan to be lands that may be put to some use other than recreation in the future. The land paralleling the UPRR is designated by the CDCA Plan as a contingency utility corridor, while the land in the vicinity of Glamis may accommodate activities and uses associated with the settlement of Glamis.

In addition to the extensive recreation-based uses that take place within the ISDRA, a wide variety of nonrecreational uses takes place within or immediately adjacent to the ISDRA.

Agricultural Uses

BOR-withdrawn lands within the ISDRA include those between the Old Coachella Canal the New Coachella Canals. In addition, BOR has maintenance and management responsibility for the New Coachella Canal and the All-American Canal. In addition to the canals, which are critical to supporting the agricultural industry of the Imperial Valley, a number of temporary use permits have been granted for apiaries.

Military

Current Department of Defense activities within the ISDRA focus on over flights to and from the military training areas to the east of the ISDRA, and use of lands in the vicinity of several target areas (Figure 3.5-1). The U.S. Navy and BLM have developed a Cooperative Agreement for management of public lands in range safety zones surrounding Navy Targets 68 and 95 on East Mesa. A Desert Plan amendment necessary to implement the agreement was proposed in 1985. The amendment would close East Mesa lands between Target 68 and the old Coachella Canal to OHV use. Under terms of the Cooperative Agreement, the Navy will review all proposed management actions within Range Safety Zone C, which includes the Gecko Management Area and much of the North Algondones Dunes Wilderness, to ensure conformity with structural height restrictions and other guidelines to safeguard aircraft operations near the targets.

Mining and Quarrying

Mineral materials removal within the ISDRA is restricted to sand and gravel quarrying, and is found to the east of the dunes in the Pilot Knob Mesa area. Free-use and sales permits have been issued. These uses and resources are discussed in greater detail Section 3.13, Geology, Energy, and Mineral Resources.

Energy Production

The northern half of the ISDRA is closed to all geothermal leasing. The dunes south of the Glamis/Gecko Open Area are open to leasing subject to a no surface occupancy stipulation. All areas outside the dunes proper are open to leasing with appropriate mitigation. Although such activities take place elsewhere in the vicinity of the SIDRA, no geothermal leases have been issued; and no development has taken place within the ISDRA. No development of oil or gas resources has occurred within the ISDRA. These resources are discussed in Section 3.13, Geology, Energy, and Mineral Resources.

Utilities and Transportation

Two major road rights-of-way (SR-78 and I-8) cross the recreation area in an east-west direction, while the UPRR runs northwest to southeast in the eastern ISDRA. The two roads provide the chief access to the ISDRA. A major utility corridor within the recreation area passes through the Buttercup Valley Open Area parallel to I-8. Existing facilities include a 500-kilovolt (kV) transmission line and a number of smaller power and telephone lines. Transmission lines also parallel the Coachella Canal and the UPRR. A high-pressure gas pipeline is located within the railroad right-of-way, and a microwave relay tower is located west of Ogilby.

Commercial and Residential Uses

Commercial land uses within the ISDRA are restricted to those at the Glamis Store, and the activities of concessionaires in locations and at times authorized by the BLM. Most of these concessions are restricted to high-use periods, chiefly the holidays during the inter half-year, when the population of OHV enthusiasts in the ISDRA swells. No permanent, residential land use occurs on BLM managed lands within the ISDRA. That occurring on private lands is restricted to the residence for the store owners at Glamis.

3.6 VISUAL RESOURCES

3.6.1 Introduction

Visual resources are managed by controlling how the landscape is altered from the natural appearance, and by introducing or maintaining variety into the "seen" area. Visual variety contributes to high-quality recreation experiences. Visual variety at the ISDRA is evidenced by contrasts in the ever-changing sand dunes and vegetation. Most of the landscape appears natural (undisturbed) with very few human-made landscape alterations. Many opportunities exist for undisturbed views that have little human intervention. The composition of the dune formations, fine textures, and color contrast between the darker vegetation and light sand is what gives the ISDRA its distinctive landscape character.

Provided below is a discussion of the regulatory framework of the BLM and a description of the visual resources of the ISDRA.

3.6.2 Regulatory Framework

The BLM has developed a system (the Visual Resource Management [VRM] Program) for evaluating the visual resources of a given area to determine what degree of protection, rehabilitation, or enhancement is desirable and possible. The BLM is concerned with managing visual resources equally with other resources and attaining acceptable levels of visual impact without unduly reducing commodity production or limiting overall program effectiveness.

The purpose of the VRM Program's is twofold: (1) to manage the quality of the visual environment and (2) to reduce the visual impact of development activities, while maintaining effectiveness in its resource programs. Managing the visual aspects of changes to the natural landscape is particularly important for the BLM because most activities taking place on BLM lands involve some degree of alteration.

Perception of visual quality in a landscape is based on several common principles:

- Landscape character is determined by four basic visual elements (form, line, color, and texture), which are present in every landscape and exert varying degrees of influence.
- The stronger the influence exerted by these elements, the more interesting the landscape.
- The more visual variety in a landscape, the more aesthetically pleasing the landscape. Variety in the landscape with harmony is considered attractive; landscape alterations that create disharmony are considered unattractive (BLM, 1980).

The BLM has not inventoried the lands within the ISDRA, nor has it given those lands relative visual ratings (Management Classifications), according to the VRM Program. There are five Visual Resource Management Classes (VRM Classes) to describe the different degrees of modification allowed to the basic elements of the landscape. These are briefly described below:

- Class 1: Natural ecological changes and very limited management activity area allowed. Any contrast created within the characteristic landscape must not attract attention. This classification is applied to wilderness areas, wild and scenic rivers, and other similar situations.
- Class 2: Changes in any of the basic elements (form, line, color, texture) caused by a management activity should not be evident in the characteristic landscape. Contrasts are seen, but must not attract attention.
- Class 3: Contrasts to the basic elements caused by a management activity are evident, but should remain subordinate to the existing landscape.
- Class 4: Any contrast attracts attention and is a dominant feature of the landscape in terms of scale; but it should repeat the form, line, color, and texture of the characteristic landscape.
- Class 5: The classification is applied to areas where the natural character of the landscape has been disturbed to a point where rehabilitation is needed to bring it up to one of the four other classifications. The classification also applies to areas where there is potential to increase visual quality of the landscape. It would be applied, for example, to areas where unacceptable cultural modification has lowered scenic quality; it is often used as an interim classification until objectives of another class can be reached.

The BLM currently manages the lands within the ISDRA according to the Multiple-Use Classes listed in the California Desert Conservation Area Plan. The CDCA Multiple-Use Classes are discussed in Section 3.1 and illustrated in Figure 3.1-1.

The VRM Classes that are associated with these Multiple-Use Classes are listed in Table 3.6-1.

Table 3.6-1 VRM Classes Associated with the Multiple-Use Classes Assigned to the Imperial Sand Dunes Recreation Area

ASSIGNED MULTIPLE-USE CLASS[A]	ASSOCIATED VRM CLASS
Class I Intensive Use	VRM Class 4
Class M Moderate Use	VRM Class 3
Class L Limited Use	VRM Class 2
Class C Controlled Use	VRM Class 1

VRM Class 5 was not assigned to any of the Multiple-Use Classes because none of the lands in the ISDRA have been degraded to the point where they require rehabilitation.

Figure 3.6-1 depicts the VRM Classes associated with the Multiple-Use Classes that are assigned to ISDRA lands. As shown in Figure 3.6-1, the popular dune areas and campgrounds within the ISDRA also can be categorized according VRM Classes, as listed in Table 3.6-2.

Table 3.6-2 Visual Resource Management Classes of OHV Use and Camping Areas

VISUAL RESOURCE MANAGEMENT CLASSES			
CLASS 1	**CLASS 2**	**CLASS 3**	**CLASS 4**
North Algodones Dunes Wilderness	Ogilby Camp Area	Area along the New Coachella Canal that includes the Sand Highway	Gecko Campground
	Patton Valley	Area south of SR-78 that is east of Ted Kipf Road	Roadrunner Campground
	China Wall Hill #5		Keyhole Campground
	Buffer Zone		Buttercup Campground
			Midway Campground
			Grays Well Camping
			Glamis Flats
			The Washes
			Garbage Flats
			Osborne Lookout
			Wildlife Viewing Area within the North Algodones Dunes Wilderness
			Brawley Slide Hill
			Oldsmobile Hill
			Competition Hill
			Test Hill
			Dune Buggy Flats
			Plank Road

3.6.3 Existing Visual Resources

The following description of the visual resources of the landscape at various areas within the ISDRA is based on a site visit conducted on October 16 and 17, 2001. The climatic conditions during the site visit included cloudy skies, no wind, and temperatures estimated to be in the 90s (°F). The ISDRA is a mostly undeveloped area consisting of sand dunes ranging in elevation from approximately 100 to 640 feet, depending on location within the dunes. The differing shapes of the dune forms add interest to the landscape. The homogeneous sand color and the fine sand texture provide a strong contrast to

the blue sky and add visual interest to the view. Certain dunes, such as Competition Hill, have horizontal ridges across the dune hills. These ridges are known as "whoop-de-do's." They add texture to the visual landscape as do the vehicle tire tracks on the dunes.

The dunes present a spectacular landscape. From the interior of the dunes, views in all directions are of dunes that are smooth, rounded hills of fine-textured, light-colored sand. Most of the dunes are devoid of vegetation. The unvegetated dunes do not provide much variety in view, but present an interesting one that is enhanced by the stark contrast of the dunes against the blue, clouded sky. The dunes that have low-lying shrub vegetation scattered across them also provide visual interest due to the contrast in texture and color provided by the vegetation and the color contrast provided by the sky. The dunes are of varying sizes, heights, and shapes due to winds blowing the sand and OHV use patterns. The closed areas and the wilderness area appear pristine, with no vehicle tracks visible. Most of the ISDRA lacks human-made development.

Development within the ISDRA includes the Cahuilla Ranger Station, the two vendor concessionaire areas, the Glamis Beach Store, and the development at certain campgrounds. Other human-made development is concentrated at or near the boundaries of the ISDRA recreational management area boundary. This includes the UPRR tracks and pipeline aboveground markers that exist along the eastern boundary of the recreation management area, the overhead electric distribution line, and the New Coachella Canal that exists along the western edge. SR-78 is the major easterly trending two-lane road that crosses the ISDRA at the southern edge of the North Algodones Dunes Wilderness. I-8 also is an easterly trending roadway near the southern edge of the ISDRA, and the All American Canal parallels I-8 on its north side. High-voltage electric transmission line development also occurs in the southern area and a communications tower exists near the Ogilby Camp Area. This development near the ISDRA boundaries reflects the character of a more urban developed area.

The ISDRA is open year-round; however, due to high summer temperatures, use tends to occur from October through Easter of each year. In addition, use on weekdays is minimal, and use on most weekends is moderate. The peak season is concentrated into six holidays: Halloween, Thanksgiving weekend, New Years, Martin Luther King Day, President's Day, and Easter break (which lasts a few weeks due to the differing "spring breaks" offered by various schools).

Although OHV use occurs throughout the open areas of the ISDRA, certain areas receive higher levels of use, such as Osborne Lookout, Competition Hill, Oldsmobile Hill, Brawley Slide Hill, Patton Valley, Test Hill, and Plank Road. During the mid-week site visit, only a few recreationists were present at these locations. Views of these areas revealed large open expanses of land (sand dunes and the flat open, sandy areas). The areas appeared relatively pristine, lacking both much human-made development and signs of heavy

recreation use. Vehicle tire tracks and boundary posts were the only signs of use/development across the dunes. The high use that occurs at these areas at peak times reflects the BLM's VRM Class 4 management of these areas.

Mammoth Wash, at the northern end of the ISDRA, receives minor use due to its remoteness. This area has dunes that are smaller than the areas further south, so less OHV opportunity exists there. This northern area has private land interspersed with BLM land. Grapefruit orchards abut the dunes, which adds color, texture, line, and form variety to the dune landscape.

OHV users intent on camping concentrate use at the Gecko Campground, Keyhole Campground, Roadrunner Campground, The Washes, Ogilby Camp Area, Buttercup Campground, and Midway Campground. During the site visit, these camp areas appeared to be vacant, vast expanses of level sand, some of which had restroom buildings and trash dumpsters, but no other development visible. These areas also appeared relatively pristine, except for the restroom and trash facilities and the signage that exists at certain areas. Photographs of these areas during peak-use weekends show these areas overflowing with recreational vehicles, OHVs, camping equipment, and recreationists, which result in a strong visual contrast to what was seen during the site visit. Review of these photographs provides a more accurate picture of the intensive use that occurs within these VRM Class 4 areas.

The Cahuilla Ranger Station, located just south of SR-78 on Gecko Road, consists of a small building and fenced equipment/vehicle storage yard. Also on Gecko Road is a vendor concessionaire area. At the time of the site visit, it was mostly vacant. One vendor, who stays there year-round, was present. The presence of vendors in this area during the peak use times of the year reflects a human-made character that strongly contrasts with the natural, undeveloped character of the dunes.

Osborne Lookout is located approximately 3 miles east of the Cahuilla Ranger Station on the south side of SR-78. It consists of a gravel parking area where camping is allowed at the southern end and day use viewing is allowed at the northern end of the area. Views to the east from the lookout are of rolling dunes in the foreground and middleground, and of the Black Mountains in the background. To the north is the North Algodones Dunes Wilderness in the foreground and the Chocolate Mountains in the distance. Views to the west and south are of the dunes.

The microphyll woodland area, located to the east of Oldsmobile Hill, is heavily vegetated due to flash floods that occur there. The abundance and type of vegetation present in this area is not characteristic of much of the ISDRA. This area exhibits much color and texture that is not seen in other areas of the ISDRA.

The Wildlife Viewing Area, within the North Algodones Dunes Wilderness, is the only interpretive area away from the Cahuilla Ranger Station. The viewing area includes explanatory wildlife and habitat information on

interpretive boards. Motorized vehicle use is not allowed or evident away from the viewing area because this area is within the wilderness area.

The Plank Road area provides a historic view of a wood plank road constructed in the early 1900s to allow motorists to cross the desert. Fragments of the Plank Road remain, and a small area of a replica of the Plank Road has also been constructed to show the public how the historic road once appeared. Interpretive information is also displayed at the partially fenced Plank Road area.

Two different types of Border Patrol barriers exist along I-8 on its south side to the west of the Buttercup Campground. The purpose of these barriers is to exclude illegal aliens from entering the United States from Mexico. These barriers provide varying levels of effectiveness. The barriers are painted white with red accents. Their form, color, and line contrast with the undisturbed desert landscape; however, this area is also a utility corridor that includes several high-voltage electric towers of varying designs.

To the east of the ISDRA and the buffer zone, is the Mesquite Mine (located to the east of the UPRR tracks). The mine includes the Mesquite Mine Overlook Trail, a 3-mile-long gravel trail that climbs a hill. It provides benches for resting, interpretive displays along the trail, and wheelchair access for the first portion of the trail. Views from the Mesquite Mine Overlook include the sand dunes, the mining area, and tailings. To the southwest, there is an unobstructed view of Oldsmobile Hill from this location.

Views from Ted Kipf Road traveling southeast from The Washes toward Ogilby Road include visible mining scars in the Cargo Muchacho Mountains to the east.

3.7 WATER RESOURCES

The Imperial Sand Dunes Recreation Area is located in the desert southeastern California, an area marked by long, hot summers and meager rainfall. Surface water in the extended vicinity of the ISDRA includes the Salton Sea, the Colorado River, and the Gulf of California. Other than canals that carry Colorado River water to the Imperial Valley, water resources in the immediate vicinity of the ISDRA are quite limited.

3.7.1 Surface Waters

There are two primary surface waterways in the vicinity of the ISDRA, the All American Canal and the New Coachella Canal.

3.7.1.1 All American Canal

All-American Canal is approximately 80 miles long and is part of the federal irrigation system of the Hoover Dam. The canal was built between 1934 and 1940 across the Colorado Desert and is entirely within the United States. Water is diverted from the Colorado River into the canal at the Imperial Dam. Flow proceeds in a westerly direction, and smaller distributary canals carry water from it into the Imperial Valley and Coachella Valley. This canal system irrigates more than 600,000 acres in the Imperial and Coachella agricultural region, and has greatly increased crop yield in the area.

The All American Canal has a bottom width of approximately 160 feet and depth of about 21 feet. The canal is lined with clay to minimize seepage. The capacity of the canal is 10,155 cubic feet per second (cfs) in the vicinity of the ISDRA. Although the All American Canal is lined, a substantial amount of water is believed to be lost through seepage.

The USACE, under Section 404 of the Clean Water Act, regulates the discharge of dredged or fill material into "waters of the United States" (33 USC 1251-1376). Permits must be obtained from the USACE prior to initiating discharges into jurisdictional "waters of the United States." "Waters of the United States" includes all waters that are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters that are subject to the ebb and flow of the tide; and tributaries of these waters (33 CFR 328.3). Because the All American Canal is tributary to the Colorado River, it is considered a water of the U.S. and within the jurisdiction of the USACE.

3.7.1.2 Coachella Canal

The New Coachella Canal is connected to the All American Canal at what is known as Drop 1 in the southern ISDRA near I-8 (see Figure 1-2). The Coachella Canal originally was completed in 1949 as an unlined channel and had a flow capacity of approximately 2,500 cfs. The canal extends northwesterly from Drop 1 (All American Canal) for approximately 123 miles and runs along the east side of the Salton Sea and west of the Plan Area. The first 48 miles of the Old Coachella Canal were replaced with a new canal called the New Coachella Canal in the early 1980s due to concerns about water loss through seepage in the East Mesa area. The Old Coachella Canal is no longer used to transport water.

The 48-mile New Coachella Canal has a flow capacity of approximately 1,550 cfs and is concrete lined to prevent seepage. Operating roads are located along either side of the newer canal. The New Coachella Canal has a bottom width of approximately 16 feet and ranges in depth from 10 to 12 feet. It runs northeast through the proposed Dune Buggy and Gecko Management Areas, and also provides a feature used to delimit the borders between the proposed Boundary Zone Management Area to the west, and the proposed management areas to the east (see Figure 1-2).

Because the New Coachella Canal is tributary to the All American Canal and the Colorado River, it is considered a water of the U.S. and within the jurisdiction of the USACE.

3.7.2 Wildlife Guzzlers

Seepage along the Old Coachella Canal resulted in a greenbelt and pools along the canal that supported various forms of wildlife. With construction and operation of the New Coachella Canal and the subsequent retirement of the southern portion of the Old Coachella Canal, wildlife dependent on the greenbelt and pools no longer had a water source. To partially mitigate the loss of this wetland habitat, the CDFG installed four windmill wells in the proposed North Algodones Dunes Wilderness Management Area and two windmill wells in the proposed Mammoth Management Area to the north. More recently the windmills were replaced by solar panels and electric pumps. The wildlife guzzlers have created limited wetland and green areas within the northern portion of the ISDRA that provide vegetation and water for wildlife.

3.7.3 Ephemeral Surface Flows

Numerous washes that carry storm runoff exist within the ISDRA. These are particularly evident as generally east to west flowing channels that have incised the distal alluvial fans of the Chocolate Mountains and the Cargo Muchacho Mountains in the eastern portion of the ISDRA. Ephemeral surface flows and pools form in the washes and low points in the eastern transition areas as a result of infrequent runoff events caused by cloudbursts in the nearby mountains. The ephemeral surface flows and pools most commonly occur in the springtime of wet years, but can also occur at other times. The pools do not remain for long periods following rains due to the permeable nature of the soils in this area.

3.7.4 Groundwater

The ISDRA is located within what recently has been termed the Amos-Ogilby-East Mesa groundwater basin (RWQCB, 2001). The basin is a northwesterly trending, elongated area of approximately 860 square miles within the southeastern portion of Imperial County, California, generally following the alignment of the trough of the Gulf of California north to the Salton Sink. It is bounded on the east by the Chocolate and Cargo Muchacho Mountains, on the north by the surface drainage/groundwater divide that separates the Amos Basin from the East Salton Sea Basin, on the west by the fine-grained, less permeable sediments of the central Imperial Valley, and to the south by the arbitrary political boundary with Mexico. The alluvial sediments that make up the water-bearing aquifer range in thickness from 0 feet on the eastern boundary at the Chocolate Mountains to as much as 10,000 feet at the western boundary of the basin in the Imperial Valley. Depth

to groundwater in the ISDRA is estimated to be several hundred feet below ground surface.

3.7.5 Beneficial Use Designations

The ISDRA is located in the Colorado River Basin within the jurisdiction of the Regional Water Quality Control Board District 7 (RWQCB7). The Colorado River Basin includes all of Imperial County and portions of San Bernardino, Riverside, and San Diego Counties. The RWQCB7 approved the *Basin Plan for the Colorado River Basin* in 1993; and this plan established beneficial use designations for the All American Canal, Coachella Canal, and the Amos-Ogilby hydrologic unit. The beneficial uses of these water sources are presented in Table 3.7-1, and a key to the use categories is presented in Table 3.7-2.

Table 3.7-1 Beneficial Use Designations

WATER BODY / UNIT	MUN	AGR	AQUA	FRSH	IND	GWR	REC I	REC II	WARM	WILD	POW	RARE
All American Canal	X	X	X	X	X	X	X	X	X	X	X	X
Coachella Canal	P	X				X	X	X	X	X		X
Amos-Ogilby Unit	X											

Source: 1993 *Basin Plan for the Colorado River Basin*.

X = Existing beneficial use. P = Potential beneficial use.

Table 3.7-2 Explanation of Beneficial Use Categories

CATEGORY	EXPLANATION
MUN	Municipal and Domestic Supply
AGR	Agricultural Supply
AQUA	Aquaculture
IND	Industrial Service Supply
GWR	Groundwater Recharge
REC I	Water Contact Recreation
REC II	Noncontact Recreation
WARM	Warm Freshwater Habitat
WILD	Wildlife Habitat
POW	Hydropower Generation
FRSH	Freshwater Replenishment
RARE	Preservation of Rare, Threatened, or Endangered Species

Source: 1993 Basin Plan – Colorado River Basin.

3.8 CULTURAL RESOURCES

3.8.1 Overview

Although an arid area, the ISDRA contains evidence of human activity from prehistoric times to the present. The eastern desert of Imperial County has served as a transportation corridor, with the Algodones dune fields encouraging most travelers to seek routes to the north or south of the Plan Area until the early 20th century.

3.8.1.1 Prehistory

The ISDRA was utilized prehistorically by a variety of Native American groups, including the Yuman-speaking Quechan and Kumeyaay (Kamia) and (possibly) the Takic-speaking Cahuilla. The extreme aridity of the dunes suggests that permanent habitation sites probably do not exist there; but temporary camps, resource acquisition and processing sites, and travel corridors are known to occur, especially around the dune margins.

Well-documented human occupation of the southern California Deserts occurred as early as 12,000 years ago, but some researchers have posited much earlier occupations as well. The Paleoindian period is manifested locally by the San Dieguito Complex, dating from about 12,000 to about 7,000 years ago. Most evidence suggests that these peoples were highly nomadic hunter-gatherers, who ranged widely across the arid Southwest. The subsequent Archaic period from about 7,000 to about 1,500 years ago is much better documented in surrounding areas, such as the Mojave Desert, the California coast, and Sonoran Desert in Arizona, than in the Lower Colorado Desert. Very few Archaic period sites have been found in Imperial County, due, in part, to arid conditions and loss due to Colorado River erosion and other impacts (Schaefer, 1994). Human occupation increased dramatically after 1,500 years ago. Archaeologists believe that ancestral Yuman-speaking groups settled along the Lower Colorado River during this time when the manufacture of pottery was first introduced. Agriculture, including the cultivation of maize, was also introduced, leading to increased populations. During this time, hydrological changes in the Colorado River delta caused the river to flow north into the Salton basin and form a vast fresh-water lake known as Lake Cahuilla. Native American groups from the river to the east and the Peninsular and Transverse ranges to the west occupied the shores of the lake at least on a temporary basis. During the Late Prehistoric period, long-distance travel for trade, warfare, and religious pilgrimages was a common practice. The Dunes probably were traversed by travel corridors, although major trails also skirted the deep sand.

Yuman-speaking Indians included the area in their tribal territory when Spaniards began to exert influence in the region in the late 1770s. Major settlements for these aboriginal groups were typically located in the mountains to the west or along the Colorado River to the east. Groups would collect resources in the Plan Area and return to larger encampments.

3.8.1.2 History

Early Spanish incursions into the Lower Colorado region began in 1540, although Spanish influence was relatively minor until the 18th century. Relationships with the local inhabitants were not always good. Initially most development occurred along the Colorado River. In the mid-1880s, to support local mining efforts, the Southern Pacific Railroad built a line that crosses what is now the eastern portion of the ISDRA. Regular service on the route began in 1877. Small communities, such as Ogilby, developed at some of the stops along the line. Around the turn of the century, the Imperial Valley experienced considerable population growth after the construction of irrigation projects. To the present day, Imperial Valley is an important agricultural area. In 1915, the planning and hard work of a group of businessmen, including Edward Fletcher and Edwin Boyd, resulted in the construction of the first plank road though the dunes (PHR Associates and Carrico, 1989). At one time, there were 8 miles of the wooden road, providing a route that shortened travel time from San Diego to Yuma by 2 days (Bates, 1970). During World War II, undeveloped portions of southeastern California, western Arizona, and southern Nevada became a vast military training area. Camp Pilot Knob, located west of the ISDRA, was one of the desert military training camps established by General George S. Patton, Jr. This large temporary settlement comprised 3,000 tents occupied by the 55th Infantry Division. In 1943, they used the camp and the surrounding areas, including the dunes, for military training maneuvers.

The 1970s and 1980s saw several construction projects in the southern part of the recreation area, with the replacement of SR-80 with I-8 and the construction of a 500-kV transmission line. These features joined the All American Canal, which had been built in the 1930s.

3.8.2 Current Inventory

A records search was conducted at the South East Archaeological Information Center to identify previous studies in the area and to locate known cultural resources. One cultural resource site currently featured for visitors to the ISDRA is the Plank Road, portions of which can be viewed adjacent to I-8. In 1985, the BLM designated the Plank Road an ACEC. The Plank Road, All American Canal, and Coachella Canal all are eligible for the National Register of Historic Places (NRHP).

3.8.2.1 Surveys

At least 20 archaeological studies have been conducted within the limits of the ISDRA. Some of the earliest documented work was in the 1950s, with the majority of surveys being carried out in the 1980s and 1990s. Many of the inventories were associated with linear projects (highways, canals, pipelines, and transmission lines). An exception to this was a major sample survey effort that the BLM conducted in the late 1970s and early 1980s. In this study, a large number of 1-mile by ¼-mile transects were surveyed throughout the dunes (Bull, 1981). Despite a number of studies having been conducted, most of the ISDRA has not been inventoried for cultural resources (see Table 3.8-1).

Based on the records search results, the level of survey appears to vary in different parts of the ISDRA. The southern portion of the ISDRA has been

subject to the most survey investigations. These investigations were generally associated with infrastructure projects and the BLM sample survey. Additional information will be available when a stratified sample survey that is underway in the spring of 2002 is completed.

Table 3.8-1 Reported Survey Coverage By ISDRA Management Area

MANAGEMENT AREA	APPROXIMATE SURVEY COVERAGE
Mammoth	<1%
North Algodones	<2%
Gecko	5%
Glamis	<3%
Dune Buggy	16%
Adaptive Management	6%
Ogilby	<1%
Buttercup	14%
Buffer	<1%1

[1]Preliminary

3.8.2.2 Cultural Resources

Over 120 cultural resources are recorded in the Plan Area. As Table 3.8-2 indicates, most of these are prehistoric archaeological sites, representing a range of activities. Although fewer historic period resources have been identified, these reflect the major historic themes of the region: mining, transportation, irrigation projects, and military activity.

Table 3.8-2 ISDRA Cultural Resources Summary[1]

PREHISTORIC RESOURCES		HISTORIC PERIOD RESOURCES	
Lithic scatters	6	Debris scatter/dump	17
Ceramic scatters	37	Military encampment	2
Habitation areas/temporary camps	9	Plank road/Roads/Railroad	5
Cleared circle	1	Canal	2
Lithic and ceramic scatter	7	Transmission line	1
Cremation	2	Rock features	1
Isolated finds	14	Movie set/Townsite/Graveyard	4
		Isolated finds/Other	14
Total	76	Total	46

[1]Record search data are preliminary for Buffer Area.

As indicated in Table 3.8-3, most of the known cultural resources have been identified in the Buffer and Ogilby Management Areas, although the size if the Management Areas varies widely. These data provide a resource

summary that will be supplemented by the cultural resources sample survey being conducted in the spring of 2002.

Table 3.8-3 Known Cultural Resources By ISDRA Management Area

MANAGEMENT AREA	PREHISTORIC RESOURCES		HISTORIC RESOURCES		
	SITES	ISOLATES	SITES	ISOLATES	TOTAL
Mammoth	3	0	1	0	4
North Algodones Dunes Wilderness Area					1*
Gecko	4	0	1	0	5
Glamis	1	1	2	2	6
Dune Buggy	13	0	0	0	13
AMA	2	0	3	1	6
Ogilby	11	3	7	1	22
Buttercup	7	3	2	0	12
Buffer	21	7	13	9	50
Resources in Multiple Management Areas	0	0	4	0	4

[1]One resource reported but not identified.

3.8.3 Management Practices

Projects involving proposed ground disturbing activities are subject to the Section 106 compliance process as prescribed in the BLM National Programmatic Agreement (NPA). Under the provision of the NPA, a Preservation Board was established and tasked with the review and revision of a series of Cultural Resource Management Manuals to provide detailed guidance for compliance efforts. When a project is proposed, inventory (Manual 8110) is conducted to identify cultural resources that are potentially eligible for the NRHP. Potentially eligible resources are evaluated, and treatment is carried out for eligible historic properties that cannot be avoided (Manual 8120). Under the NPA, there are also provisions for utilizing cultural resources for public benefit (Manual 8130), as are in place for the Plank Road.

3.8.4 Future Trends

The BLM recently has commissioned a cultural landscape study for the dunes and a sample survey for the ISDRA. The landscape study involves a holistic review of cultural elements present in the area. Both the archaeological resources and Native American values are being included in the investigation. A preliminary report on the landscape study indicates that local Native Americans have maintained a strong connection with the dunes and generally view the landscape as important. The sample survey will address different dune settings: high dunes, dune pans, and dune edge. The goal of the survey is to achieve a 5 percent sample of the Imperial Dunes, inclusive of previous systematic survey.

3.9 TRANSPORTATION AND TRAFFIC

This discussion addresses the existing vehicular traffic at the ISDRA. The scope of the analysis is limited to major public roads that provide access to the Plan Areas.

3.9.1 Existing Access

Figure 3.9-1 shows the existing access to the Plan Area that extends for more than 40 miles long and 5 miles wide near the borders of California, Arizona, and Mexico. I-8 is the only freeway providing access through the south side of the Plan Area. It is a four-lane facility linking San Diego and Arizona. SR-98 is an arterial branch from I-8 south of El Centro. It terminates and joins I-8 approximately 15 miles west of the Plan Area. SR-78 is an east-west oriented highway traversing across the central part of San Diego and Imperial Counties. It provides access to the northern end of the Plan Area and traverses north to link with I-10. Ogilby Road is a county road (S-34) linking SR-78 and I-8 along the eastern edge of the Plan Area.

3.9.2 Existing Traffic Volumes

Figure 3.9-2 shows 1999 and 2000 traffic volumes on major access roadways in the vicinity of the Plan Area. The heaviest traveled segment of roadway is on I-8 west of Sidewinder Road. It has an Average Annual Daily Traffic (AADT or ADT) volume of 13,000 vehicles and a peak-hour volume of 1,850 vehicles. The existing Level of Service (LOS) for roadway segments in the vicinity of the Plan Area is summarized in Table 3.9-1.

Table 3.9-1 2000 Level of Services

ROUTE	SEGMENT	PEAK-HOUR VOLUME	LEVEL OF SERVICE (LOS)	NOTES
I-8	West of SR-98	1,400	B	HCM[1]-98
I-8	East of SR-98	1,650	B	HCM-98
I-8	Buttercup	1,700	B	HCM-98
I-8	East of Ogilby Rd	1,750	B	HCM-98
I-8	East of Sidewinder Rd	1,850	B	HCM-98
SR-98	West of I-8	160	A	v/c[2]=0.05, rolling terrain, no passing 80%
SR-78	West of Glamis	530	C	v/c=0.19, rolling terrain, no passing 80%
SR-78	East of Glamis	290	B	v/c=0.10, rolling terrain, no passing 80%
SR-78	East of Ogilby Rd	450	C	v/c=0.16, rolling terrain, no passing 80%

[1]HCM: Highway Capacity Manual, Transportation Research Board, National Research Council, Figure 3-4

[2]v/c: Volume over capacity ratio

LOS is a measure of the quality of traffic operations based on selected factors of the type of roadway. LOS are designated from A through F. LOS A represents the best operation condition with significant freedom of maneuver, while LOS F signifies a severely congested situation with extensive delays. LOS C is generally accepted as the threshold for rural highways. The evaluation of LOS is based on methods recommended in *The Highway Capacity Manual* (HCM) published by Transportation Research Board of the National Research Council.

Table 3.9-1 indicates that all segments of roadways are operating at LOS C and better. The I-8 freeway is operating at LOS B in the vicinity of the Plan Area. It is based on the 55-mile-per-hour (mph) free-flow speed and the HCM density flow rate chart for basic freeway segments. The LOS on SR-78 varied from A to C, based on HCM LOS chart for a two-lane highway on rolling terrain and the assumption that no passing zones comprise 80 percent of the routes.

Figure 3.9-3 shows the distribution of recreational traffic related to ISDRA on existing roadway network. The distribution factors are derived from the *Imperial Sand Dunes Visitor Research Case Study* prepared in 1993 by the BLM. Table 3.9-2 shows the percentage of ISDRA traffic on the major highway segments providing access to the Plan Area. It is noted that the annual ISDRA traffic has a more significant share on SR-78 west of the Plan Area. It is 17.3 percent of the total annual traffic. The percentages of ISDRA traffic on I-8 are 5.4 percent west of the Plan Area and 0.7 percent east of the Plan Area. The shares on I-8 are relatively low because it is an interstate freeway carrying a significant amount of regional traffic between California and Arizona. Based on the annual traffic share volumes, it is observed that the segment of SR-78 west of the Plan Area would be more sensitive to the ISDRA RAMP that dictates future traffic projections.

Table 3.9-2 Annual Shares of ISDRA Traffic[1]

	ISDRA TRAFFIC		TOTAL TRAFFIC		
ACCESS	% DISTRIBUTION	1999/2000 ANNUAL ISDRA TRAFFIC	2000 AADT[2]	2000 ANNUAL TOTAL TRAFFIC	% OF ISDRA TRAFFIC
I-8 West	50	247,830	9,500	3,467,500	7.1
I-8 East	8	39,669	12,200	4,453,000	0.9
SR-78 West	32	158,675	1,900	693,500	22.9
SR-78 East	8	39,669	1,650	602,300	6.6
SR-98 West	2	9,917	1,450	529,300	1.9

[1]Based on annual project generated traffic of 495,860
[2]Annual Average Daily Traffic (AADT)

Source: California Department of Transportation

3.9.3 Seasonal Fluctuation and Peak-Hour Volumes

Historical records of ISDRA attendance indicate that it has a highly concentrated seasonal fluctuation typical of rural resort areas. Table 3.9-3 estimates the seasonal concentration of ISDRA attendance.

Table 3.9-3 Peak Attendance as ISDRA (2000-2001)

PEAK PERIOD	DURATION	PERCENT OF ANNUAL ATTENDANCE
Halloween	6 days	7
Thanksgiving	8 days	12
New Year	6 days	8
Martin Luther King's Birthday	6 days	5
President's Day	6 days	10
Easter	5 days	8
(October - May)		50

Table 3.9-3 shows that the six peak holiday seasons between mid-October and mid-April accounted for 50 percent of the visits. The Thanksgiving week is among the most crowded week and contributed 12 percent of annual attendance.

3.10 NOISE

3.10.1 Fundamentals of Noise

Noise is defined as unwanted sound. Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure. There are several ways to measure noise, depending on the source of the noise, the receiver, and the reason for the noise measurement. Environmental noise levels are typically stated in terms of decibels on the A-weighted scale [dB(A) or dBA]. Noise levels stated in terms of dBA reflect the response of the human ear by filtering out some of the noise in the low- and high-frequency ranges that the ear does not detect well. The A-weighted scale is used in most community ordinances and standards. Human hearing typically encompasses the sound range from just above 0 dBA at the quietest end to approximately 140 dBA, where pain is produced in most listeners and permanent hearing loss would result.

Table 3.10-1 shows the relative A-weighted sound levels of common sources measured in the environment and in industry (Beranek, 1988).

3.10.2 Regulatory Framework

The Noise Element of the Imperial County General Plan provides a program for incorporating noise issues into the land use and planning process, with a goal of minimizing adverse noise impacts to sensitive noise receptors. The Noise Element establishes goals, objectives, and procedures to protect the public from noise intrusion. The Noise Element for Imperial County is applicable to lands owned or zoned by the county. However, lands regulated by the state or federal government, such as the ISDRA, are pre-empted from local land use policy (Imperial County, 1993).

3.10.3 Existing Noise Environment

The ISDRA is in a relatively remote desert region of the southeastern portion of the state. The Chocolate Mountains and Cargo Muchacho Mountains are located to the north and east of the Plan Area. The town of Brawley is located to the west, and Mexico is located to the south. Recreational activities that occur on ISDRA include OHV use, camping, hiking, and flora/fauna observation.

Table 3.10-1 Typical Sound Levels Measured in the Environment and Industry

NOISE SOURCE AT A GIVEN DISTANCE	A-WEIGHTED SOUND LEVEL IN DECIBELS	NOISE ENVIRONMENTS	SUBJECTIVE IMPRESSION
Shotgun	140	Carrier Flight Deck	
Civil Defense Siren (100 ft)	130		
Jet Takeoff (200 ft)	120		Threshold of Pain
Loud Rock Music	110	Rock Music Concert	
Pile Driver (50 ft)	100		Very Loud
Ambulance Siren (100 ft)			

Table 3.10-1 Typical Sound Levels Measured in the Environment and Industry

NOISE SOURCE AT A GIVEN DISTANCE	A-WEIGHTED SOUND LEVEL IN DECIBELS	NOISE ENVIRONMENTS	SUBJECTIVE IMPRESSION
	90	Boiler Room	
Freight Cars (50 ft)		Printing Press Plant	
Pneumatic Drill (50 ft) Freeway (100 ft)	80	Noisy Restaurant	
Busy Traffic; Hair Dryer	70		Moderately Loud
Normal Conversation (5 ft)	60	Data Processing Center	
Air Conditioning Unit (100 ft)		Department Store	
Light Traffic (100 ft); Rainfall	50	Private Business Office	
Large Transformer (200 ft)			
Bird Calls (distant)	40	Average Living Room Library	Quiet
Soft Whisper (5 ft); Rustling Leaves	30	Quiet Bedroom	
	20	Recording Studio	
Normal Breathing	10		
	0		Threshold of Hearing

Source: Beranek, 1988

Ambient noise level measurements for the Plan Area are not available. However, ambient noise levels in the Plan Area and vicinity generally are assumed low and typical of remote desert areas (i.e., 35 to 50 dBA), except as may be modified by noise- generating activities in the Plan Area and vicinity, including:

- Noise from train movements on the Southern Pacific Railroad tracks located along the east side of the Plan Area
- Noise associated with occasional recreational and support activities, especially both concentrated and dispersed OHV uses of the Plan Area and immediate vicinity
- Vehicular traffic noise on major roadways leading to the Plan Area

- Intermittent military aircraft maneuvers and military weapons explosions associated with the use of the Chocolate Mountain Aerial Gunnery Range (CMAGR) located to the northwest of the Plan Area and a gunnery range north of East Mesa
- Occasional military aircraft overflights associated with flight corridors located above and adjacent to the Plan Area
- Military helicopter use of the Plan Area as a training ground for the use of night vision devices
- Mineral exploration, including drilling by Glamis Imperial under existing BLM approvals
- Natural sources such as wind, rain, thunder, and wildlife

3.10.3.1 OHV Noise Levels

OHV activities and vehicular traffic on local roads are the primary noise sources in the Plan Area. OHV noise levels are variable, with older vehicles producing higher noise levels than newer ones. California Vehicle Code Section 38370 requires that decibel levels (measured at 50 feet) for Green Sticker vehicles be below 92 dBA for vehicles manufactured before 1973 and below 82 dBA for those manufactured after 1986. According to data from *Dirt Wheels* Magazine, and tests from Oregon Dunes National Recreation Area, even with mufflers, noise levels from ATVs are found to be in the range of 81 to 111 dBA per unit at a distance of 20 inches (Scharf, 1999). A noise level of 111 dBA at 20 inches is estimated to attenuate to a level of approximately 85 dBA at a distance of 50 feet.

San Diego County performed a preliminary study of various OHV routes (OHV Route Location Study) in 1999 to identify and recommend OHV routes in the county. As part of that study, the county performed a preliminary noise analysis. Based on feedback from the San Diego Off-Road Coalition and input from the State Off Highway Motor Vehicle Recreation division (California State Parks), the county determined that a noise level of 92 dB was appropriate in their study (San Diego County, 2001). For purposes of this section, 92 dBA will be the assumed noise level at 50 feet for OHV use within the ISDRA.

The level of OHV activities in or near the Plan Area varies throughout the year, with little, if any, OHV use and noise during the summer months. Virtually all OHV usage in ISDRA occurs from approximately mid-October to May, with approximately 50 percent of total annual OHV usage occurring on the following six weekends: Halloween, Thanksgiving, New Years, Martin Luther King Jr., President's Day, and Easter. During these high-use weekends, OHV-related noise levels at the ISDRA can be relatively high within certain areas of the Plan Area. The remaining 50 percent of annual OHV usage occurs primarily on other weekends throughout the October-May period. Therefore, background OHV noise levels in and around the Plan Area range from low (during weekdays) to moderate during moderate-use weekends, and high during the six high-use weekends.

3.10.3.2 Sensitive Receptors

Sensitive noise receptors are, in general, those areas of human habitation or substantial use where the intrusion of noise has the potential to adversely impact the occupancy, use, or enjoyment of the environment. These can include residences, schools, hospitals, parks, and places of business requiring low levels of noise. Since the Plan Area is situated in a very remote area, there are no such typical sensitive human receptors in or anywhere near the Plan Area. The Cahuilla Ranger Station is located within the Plan Area, but is considered part of the administration of the ISDRA and therefore not a sensitive receptor. Hiking and flora/fauna observation activities that occur in the North Algodones Dunes Wilderness area may be more enjoyable in a quiet environment.

The closest area of likely sensitive receptors would be an unincorporated area of Imperial County located just west of East Mesa and the East Highline Canal (approximately 7 miles west of the Plan Area). The town of Brawley is located farther west, approximately 25 miles to the west of the Plan Area.

3.11 AIR QUALITY

3.11.1 Definition of Resource

Air quality is defined by ambient air concentrations of specific pollutants determined to be of concern with respect to the health and welfare of the general public. National air quality policies are regulated through the Federal Clean Air Act (CAA) of 1970 and its 1977 and 1990 Amendments. Pursuant to the CAA, the U.S. Environmental Protection Agency (EPA) established national ambient air quality standards (NAAQS) to protect the public health and welfare from the effects of air pollution. Current standards are established for six air pollutants: carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), PM_{10}, and lead (Pb). These pollutants are referred to as "criteria" pollutants because numerical health-based criteria have been established for each that define acceptable levels of exposure. Areas that violate a federal air quality standard are designated as nonattainment areas.

Pollutant emissions typically refer to the amount of pollutants or pollutant precursors introduced into the atmosphere by a source or group of sources. Pollutant emissions contribute to the ambient air concentrations of criteria pollutants, either by directly affecting the pollutant concentrations measured in the ambient air or by interacting in the atmosphere to form criteria pollutants. Primary pollutants, such as CO, SO_2, Pb, and some particulates, are emitted directly into the atmosphere from emission sources. Secondary pollutants, such as O_3, NO_2, and some particulates, are formed through atmospheric chemical reactions that are influenced by meteorology, ultraviolet light, and other atmospheric processes. In general, emissions that are considered "precursors" to secondary pollutants in the atmosphere (such as reactive organic gases (ROG) and oxides of nitrogen (NO_x), which are considered precursors for O_3) are the pollutants for which emissions are evaluated to control the level of O_3 in the ambient air.

The California Air Resources Board (CARB) subsequently established the more stringent California Ambient Air Quality Standards (CAAQS). Areas within California in which ambient air concentrations of a pollutant are higher than the state or federal or both standards are considered to be nonattainment for that pollutant. Table 3.11-1 shows both the federal and state ambient air quality standards.

EPA has revised the NAAQS several times since their original implementation and will continue to do so as the understanding of the health effects of exposure to pollution is improved. New standards for 8-hour O_3 and $PM_{2.5}$ were proposed on September 15, 1997; and policies and systems to implement these new standards will be developed in the coming years. Compliance with these new standards will be addressed during the next update of the applicable regional air quality plan, if sufficient monitoring data are available. In some cases, there may be delays of several years to allow data collection to determine baseline levels.

TABLE 3.11-1 CALIFORNIA AND NATIONAL AMBIENT AIR QUALITY STANDARDS

POLLUTANT	AVERAGING TIME	CALIFORNIA STANDARDS[1] CONCENTRATION[3]	NATIONAL STANDARDS[2] PRIMARY[3,4]	NATIONAL STANDARDS[2] SECONDARY[3,5]
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m^3)	0.12 ppm (235 µg/m^3)	Same as Primary Standard
	8 Hour	-	0.08 ppm6	-
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10 mg/m^3)	9.0 ppm (10 mg/m^3)	-
	1 Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	-
Nitrogen Dioxide (NO_2)	Annual Average	-	0.053 ppm (100 µg/m^3)	Same as Primary Standard
	1 Hour	0.25 ppm (470 µg/m^3)	-	-
Sulfur Dioxide (SO_2)	Annual Average	-	80 µg/m^3 (0.03 ppm)	-
	24 Hour	0.04 ppm (105 µg/m^3)	365 µg/m^3 (0.14 ppm)	-
	3 Hour	-	-	1300 µg/m^3 (0.5 ppm)
	1 Hour	0.25 ppm (655 µg/m^3)	-	-
Suspended Particulate Matter (PM_{10})	Annual Geometric Mean	30 µg/m^3	-	-
	24 Hour	50 µg/m^3	150 µg/m^3	-
	Annual Arithmetic Mean	-	50 µg/m^3	-
Fine Particulate Matter ($PM_{2.5}$)[6]	24 Hour	-	65 µg/m^3	-
	Annual Arithmetic Mean	-	15 µg/m^3	-
Sulfates (SO_4)	24 Hour	25 µg/m^3	No Federal Standards	No Federal Standards
Lead (Pb)	30 Day Average	1.5 µg/m^3	-	-
	Calendar Quarter	-	1.5 µg/m^3	Same as Primary Standard
Hydrogen Sulfide (HS)	1 Hour	0.03 ppm (42 µg/m^3)	No Federal Standards	No Federal Standards
Vinyl Chloride (chloroethene)	24 Hour	0.010 ppm (26 µg/m^3)	No Federal Standards	No Federal Standards
Visibility Reducing Particles	8 Hour (10 am-6 pm, Pacific Standard Time)	Insufficient amount to produce an extinction coefficient of 0.23 per kilometer– visibility of 10 miles or more (0.07-30 miles or more for Lake Tahoe) due to particles when the relative humidity is less than 70 percent. Method: ARB Method V (8/18/89).	No Federal Standards	No Federal Standards

Source: ARB Fact Sheet 39 (11/91); SCAQMD bulletin (8/97) and www.arb.ca.gov

1. California standards, other than ozone, carbon monoxide, sulfur dioxide (1 hour), nitrogen dioxide, PM_{10}, are values that are not to be equaled or exceeded. The ozone, carbon monoxide, sulfur dioxide (1 hour), nitrogen dioxide, and PM_{10} standards are not to be exceeded.
2. National standards, other than ozone and those based on annual averages or annual geometric means, are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above standard is equal to or less than one.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 mm of mercury. All measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 mm of mercury (1,013.2 millibar). PPM in this table refers to parts per million by volume or micromoles of pollutant per mole of gas.
4. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health. Each state must attain the primary standards within a specified number of years after that state's implementation plan is approved by EPA.
5. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant. Each state must attain the secondary standards within a "reasonable time" after the implementation plan is approved by EPA.
6. New federal 8-hour ozone and fine particulate matter standards were promulgated by EPA on July 18, 1997. The federal 1-hour ozone standard continues to apply in areas that violated the standard. Contact EPA for further clarification and current federal policies.

ISDRA is located in Imperial County, which is in the Salton Sea Air Basin (SSAB). The climate of Imperial County exhibits climatological characteristics typical of a desert: low annual precipitation, very hot summers, mild winters, high evaporation rates, and strong inversions. One of the main determinants of climatology is a semipermanent high-pressure area (the Pacific High) in the eastern Pacific Ocean. In the summer, this pressure center is located well to the north, causing storm tracks to be directed north of California. This high- pressure cell maintains clear skies for much of the year. When the Pacific High moves southward during the winter, weakened low-pressure storms and the orographic barrier brings little rainfall. The combination of subsiding air, protective mountains, and distance from the ocean severely limits precipitation. In Imperial County, the precipitation level is very low, averaging 2.40 inches annually (NOAA, 2001). A summary of the monthly temperatures and precipitation are shown in Table 3.11-2. The mean temperature is 73.1°F, and the mean maximum and mean minimum temperatures are 87.7° F and 58.5° F, respectively (NOAA, 2001).

The flat terrain of Imperial Valley and the strong temperature differentials created by intense solar heating produce moderate winds and deep thermal convention. The Imperial Valley region occasionally experiences periods of high winds. Predominant wind directions are westerly and west-southwesterly during all four seasons, and average annual daily wind speed is 4.1 miles per hour (CARB, 1999).

A common atmospheric condition known as a temperature inversion affects air quality in the ISDRA. During an inversion, air temperatures become warmer with increasing height rather than cooler. The presence of the Pacific high-pressure cell can cause the air mass aloft to sink. As the air descends, compressional heating warms it to a temperature higher than the air below. This highly stable atmospheric condition is called a subsidence inversion. The boundary between the layers of air acts as a temperature inversion that traps pollutants below it. The inversion layer can persist for 1 or more days, causing air stagnation and buildup of pollutants. Highest or worst-case ozone levels are often associated with the presence of this type of inversion. Subsidence inversions are common from November through June, but appear to be relatively absent July through October.

TABLE 3.11-2 AVERAGE MONTHLY TEMPERATURES AND PRECIPITATION FOR IMPERIAL, CA, 1971-2000

MONTH	IMPERIAL COUNTY AIRPORT		
	MEAN DAILY TEMPERATURES		MEAN MONTHLY PRECIPITATION (INCHES)
	MAXIMUM (°F)	MINIMUM (°F)	
January	69	42	0.42
February	74	46	0.24
March	78	50	0.22
April	85	55	0.11
May	93	62	0.01
June	102	69	0.00
July	107	78	0.10
August	105	77	0.31
September	101	72	0.26
October	91	61	0.21
November	78	49	0.23
December	70	42	0.29
Absolute extreme temperatures	119	23	2.40 (total)

Reference: Imperial County, 2001b.

3.11.2 Health Effects of Criteria Air Pollutants

Air pollutants are recognized to have a variety of health effects on humans. Research by the CARB shows that exposure to high concentrations of air pollutants can trigger respiratory diseases such as asthma, bronchitis, and other respiratory ailments and cardiovascular diseases. A healthy person exposed to high concentrations of air pollutants may be become nauseated or dizzy, may develop a headache or cough, or may experience eye irritation or a burning sensation or both in the chest. Ozone is a powerful irritant that attacks the respiratory system, leading to the damage of lung tissue. Inhaled particulate matter, nitrogen dioxide, and sulfur dioxide can directly irritate the respiratory tract, constrict airways, and interfere with the mucous lining of the airways. When it is absorbed into the bloodstream, carbon monoxide can endanger hemoglobin, the oxygen-carrying protein in blood, by reducing the amount of oxygen that reaches the heart, brain, and other body tissues. When air pollutant levels are high (a common occurrence in Southern California), children, elderly people, and people with respiratory problems are advised to remain indoors. Outdoor exercise also is discouraged because strenuous activity may cause shortness of breath and chest pains. A brief discussion of the criteria pollutants and their effects on human health and the environment is provided in Table 3.11-3.

Table 3.11-3 Criteria Air Pollutants and Their Effects on Human Health and the Environment

PHYSICAL CHARACTERISTICS	HEALTH EFFECTS	ENVIRONMENTAL EFFECTS
CO is a colorless and odorless and at high levels is a poisonous gas. It is a component of motor vehicle exhaust. Peak CO concentrations typically occur during the colder months of the year and nighttime inversion conditions.	Exposure to CO reduces oxygen delivery to the body's organs and tissues. Elevated levels are dangerous to those who suffer from cardiovascular disease. CO can be poisonous, can cause visual impairment, reduce work capacity and manual dexterity, and inhibit learning ability.	None.
Ground-level ozone (the primary constituent of smog) is not emitted directly into the air but is formed by the reaction of volatile organic hydrocarbons (VOCs) and nitrogen oxides (NOx) in the presence of heat and sunlight.	Exposure to ambient ozone has been linked to increased hospital admissions and emergency room visits for respiratory causes, including respiratory infection, asthma, significant decreases in lung function, chest pain, and cough.	Ozone also affects vegetation and ecosystems, leading to reductions in agricultural and commercial forest yields, reduced growth and survivability of tree seedlings, and increased plant susceptibility to disease, pests, and other environmental stresses (e.g., harsh weather).
NO_2 is a reddish brown, highly reactive gas. The major sources of man-made NOx emissions are high-temperature combustion processes. Home heaters and gas stoves also produce substantial amounts of NO_2 in indoor settings.	Exposures to NO_2 may reduce airway and lung function, increase respiratory illnesses in children, and increase susceptibility to respiratory infection. Atmospheric transformation of NOx can lead to the formation of ozone and PM, both of which are associated with adverse health effects.	NO_2 is a precursor of acid rain and is linked to a wide range of environmental effects, including changes in the composition and competition of some species of vegetation, visibility impairment, acidification of freshwater bodies, eutrophication of estuarine and coastal waters, and increases in levels of toxins harmful to fish and other aquatic life.
SO_2 is formed when fuel containing sulfur (mainly, coal and oil) is burned, and during metal smelting and other industrial processes. The highest concentrations of SO_2 occur in the vicinity of large industrial facilities.	Exposure to SO_2 can result in temporary breathing impairment, reduced lung function, wheezing, chest tightness, or shortness of breath, respiratory illness, alterations in the lungs' defenses, and aggravation of existing cardiovascular disease.	SO_2 is a major precursor of acid rain, which is associated with the acidification of soils, lakes, and streams, accelerated corrosion of buildings and monuments, and reduced visibility.
PM consists of a mixture of airborne solid particles and liquid droplets that originate from both man-made and natural sources. Fine particles ($PM_{2.5}$) are generally emitted from fuel combustion sources. Coarse particles (PM_{10}) are generally emitted from sources that cause wind-blown or entrained dust. SO_x, NO_x, and VOC also interact with compounds in the air to form PM.	Inhalable PM can accumulate in the respiratory system and is associated with numerous health effects, including the aggravation of respiratory conditions (asthma), increased hospital admissions and emergency room visits for heart and lung disease, increased respiratory symptoms, decreased lung function, and even premature death.	PM is the major cause of reduced visibility in many parts of the United States. Airborne particles also can cause damage to paints and building materials.
Pb emissions to the atmosphere were formerly dominated by automotive sources. As a result of the elimination of leaded gasoline, metals processing facilities are currently the primary source of Pb emissions. The highest air concentrations of Pb are found in the vicinity of smelters and battery manufacturers.	Exposure to Pb occurs mainly through inhalation and ingestion pathways. It accumulates in the blood, bones, and soft tissues. Pb can adversely affect the kidneys, liver, nervous system, and other organs. Excessive exposure to Pb may cause neurological impairments, such as seizures, mental retardation, behavioral disorders, damage to the nervous systems of fetuses and young children, and may be a factor in high blood pressure and subsequent heart disease.	Lead can also be deposited on the leaves of plants, presenting a hazard to grazing animals.

3.11.3 Toxic Air Contaminants

The federal and state laws and regulations also define a group of pollutants called "hazardous air pollutants," "toxic air contaminants," or "air toxics." These pollutants are regulated by the National Emissions Standards for Hazardous Air Pollutants (NESHAPS) section of the federal Clean Air Act; various state laws and regulations; state air toxics acts (e.g., the AB 1807, AB 2588, and SB 1731 programs); and Imperial County Air Pollution Control District (APCD) Regulations XI and XII. In urban areas, toxic air contaminants are a concern because of the concentration of people living close to large sources of emissions. The combination of toxic emissions from vehicles, industry, and multiple area sources creates an unhealthy mix that varies based on geography, industry, population, and other factors. Exposure to toxic air pollutants may cause or contribute to cancer, birth defects, genetic damage, and other adverse health effects.

In Imperial County, the Imperial County APCD is the agency responsible for protecting public health and welfare through the administration of federal and state air quality laws, regulations, and policies. Included in the tasks for APCD are the monitoring of air pollution, the preparation of the State Implementation Plan (SIP) for the San Diego Air Basin (SDAB), and the promulgation of Rules and Regulations. The SIP included strategies and tactics to be used to attain the federal O_3 standard in Imperial County. The elements are taken from the Air Quality Attainment Plan, the APCD plan for attaining the state O_3 standard, which is more stringent than the federal standard (Imperial County APCD, 1991). The Rules and Regulations include procedures and requirements to control the emission of pollutants and to prevent adverse impacts.

3.11.4 Federal Clean Air Act Conformity

The CAA Amendments of 1977 (42 United States Code [USC] 7401, et seq.) state that the federal government is prohibited from engaging in, supporting, providing financial assistance for, licensing, permitting, or approving any activity that does not conform to an applicable SIP. Federal actions related to transportation plans, programs, and projects developed, funded, or approved under 23 USC or the Federal Transit Act (49 USC 1601, et seq.) are covered under separate regulations for Transportation Conformity.

In the 1990 CAA Amendments, EPA included provisions requiring federal agencies to ensure that actions undertaken in nonattainment or attainment-maintenance areas are consistent with applicable SIPs. Imperial County APCD has adopted Rule 1501, Conformity of General Federal Actions. The process of determining whether or not a federal action is consistent with applicable SIPs is called "conformity." The general conformity rules establish a process to demonstrate that federal actions would be consistent with applicable SIPs and would not cause or contribute to new violations of the NAAQS, increase the frequency or severity of existing violations of the NAAQS, or delay the timely attainment of the NAAQS. The emission thresholds that trigger requirements of the conformity rule are called *de minimis* levels.

A determination of conformity with the applicable SIP is required for each pollutant where the total direct and indirect emissions in a nonattainment or attainment-maintenance area caused by the action would exceed *de minimis* levels. The General Conformity *de minimis* thresholds are defined in 40 CFR 93.153(b) and in Rule 1501. In addition, the project proponent must demonstrate that the total direct and indirect emission increases associated with the action will not be regionally significant; that is, they will not represent 10 percent or more of an emission inventory or emissions budget of an area.

The General Conformity rules do not apply to federal actions in areas designated as nonattainment of the CAAQS only.

3.11.5 Compliance with Air Quality Standards

Under the 1977 Amendments to the CAA, those states with air quality that did not achieve the NAAQS were required to develop and maintain SIPs. These plans constitute a federally enforceable definition of the approach of the state (or "plan") and schedule for the attainment of the NAAQS. Air quality management areas are designated as "attainment," "nonattainment," or "unclassified," depending on whether or not they achieve the NAAQS and CAAQS. In addition, California can also designate areas as "transitional." It is important to note that, because the NAAQS and CAAQS are different in many cases, it is possible for an area to be designated as attainment by EPA (meets the NAAQS) and "nonattainment" by the CARB (does not meet the CAAQS) for the same pollutant. Also, an area can be designated as attainment for one pollutant (e.g., NO_2) and nonattainment for others (O_3 and PM_{10}).

Areas that were designated as attainment in the past, but have since achieved the NAAQS, are further classified as "attainment-maintenance." The maintenance classification remains in effect for 20 years from the date that the area is determined by EPA to meet the NAAQS. There are numerous classifications of the nonattainment designation, depending on the severity of nonattainment. For example, the O_3-nonattainment designation has seven subclasses: transitional, marginal, moderate, serious, severe-15, severe-17, and extreme. Areas that lack monitoring data are designated as unclassified areas and treated as attainment areas for regulatory purposes.

The SSAB, which coincides geographically with the desert region of Imperial and Riverside Counties, currently meets the federal and state standards for all pollutants except O_3 and PM_{10}. The SSAB is currently classified as a federal and state "serious" O_3-nonattainment area and nonattainment area for PM_{10}. ISDRA is located within an attainment area for the federal and state CO, NO_2, SO_2, and Pb standards. The City of Calexico, located at the California/ Mexico International border, is in a nonattainment area for CO.

CARB monitors ambient air quality at approximately 250 air monitoring stations across the state. Air quality monitoring stations usually measure pollutant concentrations 10 feet above ground level; therefore, air quality is often referred to in terms of "ground-level" concentrations. Factors affecting ground-level pollutant concentrations include the rate at which pollutants are

emitted to the atmosphere, the height from which they are released, the physical combination of emissions from various sources, the formation of secondary pollutants, the interaction of pollutants with topographic features, and meteorological conditions. Meteorological parameters that affected pollutant dispersion the most are wind speed and direction, atmospheric stability, mixing height, and temperature.

Ambient criteria air pollutant concentration in the SSAB are measured at six air quality monitoring stations operated by Imperial County APCD and CARB. The nearest air quality monitoring station operating in the vicinity of the Plan Area is a monitoring station located at Calexico East, approximately 20 miles to the southwest of the Plan Area. The station monitors O_3, CO, NO_2, SO_2, PM_{10}, and Pb. Data for the years 1996 to 2000 are summarized in Table 3.11-4. Over the last 5 years, the federal and state standards for NO_2, SO_2, and Pb have not been exceeded at the Calexico East Station. For the last 3 years, the federal and state 24-hour and annual standards for PM_{10} were exceeded every year. Ozone levels at the Calexico East Station exceeded federal and state standards in every year from 1996 to 2000.

3.11.6 Sources of Regional and Local Pollution

The most significant sources of O_3, NO_2, CO, and PM_{10} in SSAB are automobiles and OHVs. The greatest source (87 percent) of PM_{10} is road dust. Ozone is formed by the reaction of ROG and NO_x, which are largely combustion products from gas and diesel engines. Ozone is a regional air pollutant because its precursors are transported and diffused by wind concurrently with ozone production. In Imperial County, 68 percent of the 310 tons per day of ROG emitted come from mobile sources (i.e., automobiles, trucks, marine vessels, aircraft, and heavy equipment). For NO_x, 88 percent of the 240 tons emitted daily are from mobile sources. Some ozone levels in excess of the federal and state standards can be traced to emissions of ozone precursors transported by wind from the South Coast Air Basin and from Mexico. Computer modeling of smog formation has shown that a reduction of approximately 25 percent each of NO_x and ROG would allow the SSAB to meet the federal O_3 standard on days when there is no substantial transport of pollution from the South Coast Air Basin or other airshed (District, 1999).

High concentrations of PM_{10} in many areas in Imperial County result from wind action. The wind picks up particles from disturbed and undisturbed surfaces, recreational travel on paved and unpaved roadways, construction and demolition activities, and farming operations such as crop burning. These particles can remain suspended in the air for long periods and can travel a great distance. The principal health effect of airborne particulate matter is on the respiratory system.

Table 3.11-4 Ambient Air Quality Summary, Calexico – East Monitoring Station

POLLUTANT	AVERAGING TIME	CALIFORNIA AIR QUALITY STANDARDS	FEDERAL PRIMARY STANDARDS	MAXIMUM CONCENTRATIONS (A)					NUMBER OF DAYS EXCEEDING FEDERAL STANDARD (B)					NUMBER OF DAYS EXCEEDING STATE STANDARD (B)				
				1996	1997	1998	1999	2000	1996	1997	1998	1999	2000	1996	1997	1998	1999	2000
Oxidants (Ozone)	1 hr	0.09 ppm	0.12 ppm	0.162	0.121	0.236	0.156	0.108	3	0	1	3	0	22	6	27	13	7
	8 hrs (c)	N/A	0.08 ppm	0.117	0.092	0.101	0.110	0.079	12	2	13	5	0	N/A	N/A	N/A	N/A	N/A
Carbon Monoxide	1 hr	20 ppm	35 ppm	22.0	21.0	18.4	14.0	17.6	0	0	0	0	0	1	1	0	0	0
	8 hrs	9 ppm	9 ppm	8.74	16.29	13.00	9.37	11.30	0	2	3	0	1	0	4	3	1	1
Nitrogen Dioxide	1 hr	0.25 ppm	N/A	0.072	0.091	0.105	0.110	0.124	N/A	N/A	N/A	N/A	N/A	0	0	0	0	0
	Annual	N/A	0.053 ppm	0.007	0.011	0.011	0.013	0.012	0	0	0	0	0	N/A	N/A	N/A	N/A	N/A
Sulfur Dioxide	1 hr	0.25 ppm	N/A	0.036	0.035	0.026	NM	NM	N/A	N/A	N/A	N/A	N/A	0	0	0	N/A	N/A
	24 hrs	0.05 ppm	0.14 ppm	0.010	0.015	0.009	NM	NM	0	0	0	N/A	N/A	0	0	0	N/A	N/A
	Annual	N/A	0.03 ppm	0.001	0.002	0.003	NM	NM	0	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PM_{10}	24 hrs	50 µg/m^3	150 µg/m^3	NM	NM	568	1,342	1,613	N/A	N/A	10	20	32	N/A	N/A	44	51	57
	Annual	30 µg/m^3	50 µg/m^3	NM	NM	107.8	168.7	238.8	N/A	N/A	1	1	1	N/A	N/A	1	1	1
Lead	Quarterly Average	N/A	1.5 µg/m^3	0.05	0.03	0.03	0.02	0.02	0	0	0	0	0	N/A	N/A	N/A	N/A	N/A

Source: AIRData, U.S. EPA Office of Air Quality Planning and Standards: Imperial County, CA 1996 - 2000. EPA website: http//www.epa.gov/air/data

Notes:

(a) Concentration units for ozone, carbon monoxide, nitrogen dioxide, and sulfur dioxide are in parts per million (ppm). Concentration units for PM_{10} and lead are in micrograms per cubic meter (µg/m^3).

(b) For annual standards, a value of 1 indicates that the standard has been exceeded.

(c) The number of days above the 8-hour ozone standard is not the number of violations of the federal standard for the year. The number of days is presented for display purposes until the EPA completes the 8-hour ozone monitoring evaluation program.

NM = Not Monitored.
N/A = Not applicable.

Emissions sources associated with the existing use of ISDRA consist of combustion emissions from OHVs; small internal-combustion generator engines; recreational vehicles and on-road motor vehicles (commuting to, delivery at, traveling inside, and departing from the site); and fugitive dust emissions entrained from vehicles travelling over paved and unpaved surface. The principal sources of criteria pollutant emissions are automobiles and recreational vehicles.

The South Coast Air Quality Management District (SCAQMD) recently released a draft report, referred to as the *Multiple Air Toxics Exposure Study* (SCAQMD, 1999), discussing the exposure risk to toxic air contaminants in Southern California. The report stated that about 70 percent of all estimated human health risk to toxic air contaminants is attributed to diesel exhaust (particulate emissions); about 20 percent to other toxic compounds associated with mobile sources such as benzene and 1,3-butadiene; and about 10 percent to stationary sources. Existing emitters of toxic air pollutants include automobiles, trucks, recreational vehicles, portable fuel storage tanks, and OHV rental stations.

3.12 HAZARDOUS MATERIALS

This section evaluates the storage and use of hazardous materials and the storage and disposal of nonhazardous and hazardous waste within the ISDRA. In addition, a discussion of applicable environmental regulations and the results from a search of applicable federal and State of California environmental databases is provided. Existing effects to human health and the environment are discussed to provide a baseline from which the proposed project alternatives can be analyzed.

3.12.1 Current and Past Uses of Adjoining Property

As described in Section 3.5 (Land Use and Ownership), land uses proximate or adjacent to the ISDRA Plan Area include a number of nonrecreation applications. These land uses include BOR-withdrawn lands, military target areas, sand and gravel sales activities, geothermal leases, oil and gas leases, mining, and utility transportation rights-of-way. Although certain of these land uses have an unquantified potential for minor hazardous material releases or localized contamination, they are not of the type that typically would be expected to pose a substantial hazardous material-related threat to the surrounding environment.

3.12.2 Environmental Regulations

The storage and use of hazardous materials is governed by federal, state, and local laws, ordinances, regulations, and standards (LORS). Applicable laws and regulations that address the use and storage of hazardous materials are discussed below along with applicable LORS that address the storage, transportation, and disposal of nonhazardous and hazardous waste.

3.12.2.1 CERCLA

Hazardous materials are governed under existing federal regulation through the Environmental Response, Compensation, and Liability Act (CERCLA), commonly knows as Superfund. This law provides broad federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. Title III of SARA, an amendment to CERCLA, requires states to establish a process for developing local chemical emergency preparedness programs and to receive and disseminate information on hazardous materials present at facilities in local communities.

3.12.2.2 RCRA

The federal statute that controls both nonhazardous and hazardous waste is Resource Conservation and Recovery Act (RCRA), 42 USC Sections 6901, et seq., and its implementing regulations found at 40 CFR 260, et seq. Subtitle D makes the regulation of nonhazardous waste the responsibility of the states; federal involvement is limited to establishing minimum criteria that prescribe the best practicable controls and monitoring requirements for solid waste disposal facilities. Subtitle C controls the generation, transportation, treatment, storage, and disposal of hazardous waste through a comprehensive "cradle to grave" system of hazardous waste management techniques and requirements. It applies to all states and to all generators of hazardous waste (above certain levels of waste produced). EPA is responsible for

implementing the law. The State of California laws for managing hazardous wastes is in Title 22 of the California Code of Regulations (CCR).

3.12.2.3 Health and Safety Code Section 25500 (Waters Bill)

California Health and Safety Code, Section 25500, et seq., and the regulations to the law in 19 CCR Section 2620, et seq. require local governments to regulate local business storage of hazardous materials in excess of certain quantities. The law also requires that entities storing hazardous materials be prepared to respond to releases. The threshold quantities for hazardous materials are 55 gallons for liquids, 500 pounds for solids, and 200 cubic feet for compressed gases measured at standard temperature and pressure.

3.12.2.4 Health and Safety Code Section 25531 (La Follette Bill)

California Health and Safety Code, Section 25531, et seq., regulates the registration and handling of acutely hazardous materials. Acutely hazardous materials are any chemicals designated as an extremely hazardous substance by EPA as part of its implementation of Superfund Amendments and Reauthorization Act (SARA) Title III.

3.12.2.5 Aboveground Petroleum Storage Act

California Health and Safety Code Sections 25270 to 25270.13 is intended to ensure compliance with the federal Clean Water Act. The law applies if a facility has an aboveground storage tank (AST) with a capacity greater than 660 gallons or a combined AST capacity greater than 1,320 gallons, and if there is a reasonable possibility that the tank(s) may discharge oil in "harmful quantities" into navigable waters or adjoining shore lands.

3.12.2.6 Safe Drinking Water and Toxics Enforcement Act (Proposition 65)

This California law identifies chemicals that cause cancer and reproductive toxicity, informs the public, and prevents discharge of the chemicals into sources of drinking water. Lists of the chemicals of concern are published and updated periodically. The Act is administered by the California Office of Environmental Health Hazard Assessment.

3.12.2.7 Solid Waste

Nonhazardous solid waste is regulated by the California Integrated Waste Management Act (CIWMA) of 1989, found in Public Resources Code (PRC) Sections 40000, et seq. This law provides an integrated statewide system of solid waste management by coordinating state and local efforts in source reduction, recycling, and land disposal safety. Counties are required to submit Integrated Waste Management Plans to the state. This law directly affects Imperial County and the solid waste hauler and disposal company that will collect nonhazardous waste. It also affects BLM to the extent that hazardous wastes are not to be disposed with solid waste.

Nonhazardous solid and liquid waste generated within the ISDRA are placed into one of three dumpsters located within the Plan Area. The dumpsters are removed by a waste removal company. The portion of the waste that is recyclable will be recovered, and the remaining waste will be deposited in a Class III landfill. The quantity of this waste is currently unknown. Solid and liquid hazardous materials and petroleum products are not permitted to be placed in the dumpsters.

3.12.2.8 Imperial County

Local regulations relating to hazardous materials in Imperial County are managed by the environmental health agency of the county.

3.12.3 Environmental Database Results

A review of available environmental records was performed to determine and identify known hazards associated with the Plan Area and adjacent properties. An electronic database report (EDR) was obtained from Fidelity Information Services, prepared in accordance with the American Society for Testing and Materials (ASTM) practices, which include all reasonably ascertainable environmental records including state and federal sources. The ASTM list of records, including the approximate minimum search distances and the resulting number of sites found within the ASTM search distance, measured from the perimeter of the Plan Area, are shown in Table 3.12-1. Descriptions of the databases searched below are provided in the following paragraphs.

For the above-referenced ASTM search parameters, the EDR did not identify any known sites of environmental significance within the ASTM standard search distances.

The following is a brief summary of each database searched that resulted in known sites within or nearby the Plan Area. The sites are plotted in Figure 3.12-1.

Facility Index System (FINDS) – The FINDS database is an inventory of all facilities that are regulated or tracked by EPA. These facilities are assigned an identification number that serves as a cross-reference for other databases in the EPA program system. A review of the database results indicates two FINDS sites were identified within the survey area. These sites are as follows:

- Santa Fe Pacific Minerals, Mesquite Mine. The site is located along SR-78 in the eastern portion of the Plan Area.
- Arid Operations, Inc. The site is located along SR-78 in the eastern portion of the Plan Area.

Table 3.12-1 Site Distribution Summary – Imperial Hills Sand Dunes Recreation Area

AGENCY/DATABASE – TYPE OF RECORDS	WITHIN ⅛ MILE	⅛ TO ¼ MILE	¼ TO ½ MILE	½ TO 1 MILE
A) Databases searched to 1 mile				
EPA – NPL. National Priority List.	0	0	0	0
EPA – CORRACTS. (RCRA Corrective Action [w/o TSD]).	0	0	0	0
State – SPL. State equivalent priority list.	0	0	0	0
B) Databases searched to ½-mile				
EPA – RCRA TSD. RCRA permitted treatment, storage, disposal facilities.	0	0	0	-
State – SCL. State equivalent CERCLIS list.	0	0	0	-
EPA – CERCLIS/NFRP. Sites currently or formerly under review by EPA.	0	0	0	-

Table 3.12-1 Site Distribution Summary – Imperial Hills Sand Dunes Recreation Area

AGENCY/DATABASE – TYPE OF RECORDS	WITHIN ⅛ MILE	⅛ TO ¼ MILE	¼ TO ½ MILE	½ TO 1 MILE
STATE REG CO – LUST. Leaking Underground Storage Tanks.	0	0	0	-
STATE/REG/CO – SWLF. Permitted as SWLF, incinerators, or transfer stations.	0	0	0	-
STATE – DEED RSTR. Sites with deed restrictions.	0	0	0	-
STATE – CORTESE. State index of properties with hazardous waste.	0	0	0	-
STATE – TOXIC PITS. Toxic Pits cleanup facilities.	0	0	0	-
STATE – FINDS – Facility Index System.	2	0	0	-
USGS/STATE – WATER WELLS. Federal and State Drinking Water Sources.	4	0	0	-
US EPA TRIS – Toxic Release Inventory Database.	0	0	0	-
C) Databases searched to ¼-mile:				
State – UST. Registered underground storage tanks.	0	0	-	-
State – AST. Registered aboveground storage tanks.	1	0	-	-
D) Databases searched to ⅛-mile:				
EPA – GNRTR. RCRA registered small or large generators of hazardous waste.	2	-	-	-
EPA - RCRA Violations – RCRA violations/enforcement actions.	0	-	-	-
STATE – SPILLS. State spills list.	2	-	-	-
Total Sites	10	0	0	0

The EDR also includes a category of "unmapped" sites. Sites are included in the unmapped category when the database information is not accurate enough to positively identify the site locations. The database report for the site identified two unmapped sites, which were identified from the FINDS database report. The unmapped facilities are noted as:

- United States Department of Interior Laguna Field Office U.S. Government, RTE 1 Box 201, Winterhaven, CA 92283
- Glamis Radio Repeater, Black Mountain, Glamis, CA 92248

United States Geological Survey Wells /WATER WELLS – The Groundwater Site Inventory (GWSI) database is maintained by the United States Geological Survey (USGS). The database contains information for over 1 million wells and other sources of groundwater that the USGS has studied, used, or documented during research. A review of the database results indicate four USGS WATER WELLS were identified within the survey area. These WATER WELLS are used by the USGS for research purposes, and are located in the northern, eastern, and southern portions of the Plan Area.

State-of-California AST – The database maintains a list of aboveground storage tanks. A review of the database results indicate one STATE AST site was identified within the survey area. The site is as follows:

- Newmont Gold Company. This site is located along SR-78 in the eastern portion of the Plan Area.

GNRTR – The database maintains a list of RCRA-registered small or large generators of hazardous waste. A review of the database results indicates two GNRTR sites were identified within the survey area. The sites are as follows:

- Santa Fe Pacific Minerals. The site is a registered small quantity generator and is located along SR-78 in the eastern portion of the Plan Area.

- Arid Operations, Inc. The site is a registered small quantity generator and is located along SR-78 in the eastern portion of the Plan Area.

SPILLS – The database maintains a list of spills from the Emergency Response Notification System (ERNS). The ERNS is a national computer database system that is used to store information on the sudden or accidental or both release of hazardous substances, including petroleum, into the environment. The ERNS contains preliminary information on specific releases, including the spill location, the substance released, and the responsible party. A review of the database results indicates two ERNS sites were identified within the survey area.

- On July 3, 1991, 50 gallons of sodium cyanide solution were spilled at a site located along SR-78 in the eastern portion of the Plan Area. The origin of the spill was unknown, and no waterway was affected by the spill. Based on the EDR provided by Fidelity Information Services, no further monitoring or remedial action has been required. Therefore, this site has a low potential to affect existing conditions in the ISDRA Plan Area.

- On June 26, 2000, 9,900 pounds of hydrogen cyanide emissions were released to the atmosphere at a site located along SR-78 in the eastern portion of the Plan Area. No other media was affected by the release. The origin of the release was not given. Due to the time that has elapsed since the release, the site has a low potential to affect existing conditions at the ISDRA. Based on the EDR provided by Fidelity Information Services, no further monitoring or remedial action has been required. Therefore, this

site has a low potential to affect existing conditions in the ISDRA Plan Area.

3.13 GEOLOGY, ENERGY, AND MINERAL RESOURCES

This section establishes the existing geologic conditions, including general seismicity, as well as energy and mineral resources. The local and regional geologic setting of the Algodones Dunes Area was researched using previous environmental assessment reports, soil reports, federal geographic information system (GIS) database maps, and technical research papers on the California desert.

3.13.1 Soil and Geologic Conditions

The soil and geologic conditions of the Plan Area are summarized in this section, including a general description of the geologic setting earth materials and the geologic (dune) structure. The geologic study of the Plan Area includes evaluation of surface soils.

3.13.1.1 General Description of Geologic Setting

The Imperial Sand Dunes (also known as the Algodones Sand Dunes) are the largest mass of sand dunes in California. This dune system extends for more than 40 miles along the eastern edge of the Imperial Valley agricultural region in a band averaging 5 miles in width. It is roughly bordered on the west by the Coachella Canal, which delivers Colorado River water to the fertile agricultural valley to the north. A major east-west route of the UPRR skirts the eastern edge.

The dune system is situated on a relatively flat plain that has an elevation of approximately 50 feet above sea level. On the west, the plain is called East Mesa (because it is east of Imperial Valley). On the east, the plain is called Pilot Knob Mesa.

The dunes reach heights of 300 feet above the plain, and include classic examples of several different types of dunes. The sand dunes are thought originally to have been beach sands of ancient Lake Cahuilla, which occupied the Imperial Valley at a time when the Colorado River emptied into it instead of the Gulf of California. Unlike some major dune systems that have formed next to a mountain range, the Imperial Dunes have formed here primarily as a result of opposing seasonal winds. Winter winds come from the northwest, but often reverse to the southeast in summer. The stronger winter winds are slowly pushing the dune system southeastward.

The east and west sides of the dunes system differ substantially in character. West side sands are composed of material that is generally heavier and coarser than the lighter, finer sands carried further east in the prevailing winds. The coarse sands form the largest, tallest dunes, located in the western two-thirds of the dune system. These constitute the “primary dunes.” The tallest dunes are found toward the center of the overall dune mass, in the eastern half of the primary dune area. East of the primary dunes are the “secondary dunes,” smaller dunes composed of finer sands and having more vegetation cover (BLM, 1987).

3.13.1.2 Geologic Structure

The Plan Area includes a great variety of dune forms, but is dominated by prominent transverse ridges. Some consider the Algodones Dunes to be a chain of over-size barchans, whose horns join. Barchan dunes are crescent in shape, develop on a flat surface, with a moderate sand supply transported mostly by unidirectional winds. The dominant sand-driving winds in this area blow from the northwest to the southeast, parallel to the gross trend of the Algodones Dunes. Barchans can advance across the desert, horns first, at rates varying from a few inches to tens of feet per year, depending upon the size of the dune and the amount of erosion due to wind, water, and vehicles. The source of the dunes is most likely from the northwest, developed from a large plume of sand driven inshore from the beaches of ancient Lake Cahuilla, which once occupied the present location of the Salton Basin.

In the southwest part of the Algodones Dune area are several long (about 6 miles) examples of seif dunes. Seif dunes are formed when the sand-driving winds come from several directions, but within narrow limits, 15 to 20 degrees, and the barchan form becomes elongate and hook-shaped, forming the linear sand ridges or "seif" dunes, as cross winds come from wider and wider angles. These linear ridges rise approximately 30 feet or so above the dune mass and form distinct ridges that curve and fade into the main dune mass to the north.

Of all the California Dunes, the Algodones Dunes show the most evidence of age. They have a distinctive light brown color, much darker than younger pale gray or white sands of the Coachella Valley near Palm Springs toward the northwest. The darker color suggests that the Algodones Dunes have been around for a long time, probably dating back to the latter part of the Pleistocene, 10 to 20 thousand years ago, or longer (Norris-Sand Dunes of the California Desert).

Heavy vehicle use in the Algodones Dunes has modified some of the smaller dune forms (Norris, Sand Dunes of California). One of the most interesting dune areas geologically is the southern portion of the Plan Area, on either side of I-8. It is in this area that the greatest array of dune forms occur. Vehicle disturbances change the small-scale dune forms, such as ripples, sand shears, and dune crests. Concentrations of heavier coarse- grained materials are apt to be displayed imperfectly as a result of vehicle disturbance unless strong winds have occurred just prior to observation of the dunes.

The Algodones Dunes have a scientific value and are used as a teaching and research area. The southern portion of the study area has the greatest array of geological features. North of I-8, the finest examples of seif dunes occur, as well as some interesting elongate sand ridges extending from the mega-barchans.

3.13.1.3 Sand and Soils

A soils report was written for Imperial County by the U.S. Department of Agriculture Soil Conservation Service (October 1981). The geographic limits of the soil report investigation ended along the western edge of the Algodones Dunes Area. No detailed soil information was found for most of the Plan Area east of the western edge. Based on findings from the soil report, the

western edge of the study area is composed primarily of Rositas sands with lesser areas of Antho loamy fine sands/Holtville silty-clay loams.

The Rositas sands are distributed throughout the Plan Area. These sands range in properties from loamy fine sands, to fine sands, to medium sands. The larger-grained Rositas sands are mostly in the western, upwind section of the subject area with the finer sands located mostly on the eastern downwind side of the dunes area. Typically, the Rositas sands are stratified, with reddish yellow to light brown coloring. These sands are formed in alluvial or eolian deposits from distant sources. Typically, the surface layer of the Rositas soil is light brown, loamy, fine sand about 4 inches thick. The underlying material is pinkish and very pale brown sand to a depth of 60 inches and can have thin gravelly subsurface layers. In many places, there are soils that have a sandy profile and a few thin lenses of fine sandy loam, silt loam, or silty clay loam. Permeability is rapid, and available water capacity is low. Surface runoff is slow, and there is a high hazard of soil blowing and abrasion to young plants. The effective rooting depth is 60 inches or more.

The Antho loamy fine sands/Holtville silty-clay loams are found in smaller pocket areas, most of which lie south of SR-78 and just east of the Coachella Canal. These soils are deep and well drained and typically form in alluvial sediments of mixed sources. Surface textures are composed of fine sandy loam, silty loam sand, and silty-clay loam. Typically, the surface layer of this Antho/Holtville soil is reddish loamy fine sand about 13 inches thick. Underlying this is reddish yellow or pink fine sandy loam to a depth of 42 inches. Below this is stratified, contrasting material of finer or coarser texture. Permeability of the loamy sands is moderately rapid, and available water capacity is low to moderate. Permeability of the silty-clay loams is moderately slow, and available water capacity can be high. Surface runoff is slow, and the hazard of soil blowing for the sandy loam is high. The effective rooting depth is 60 inches or more. These soils have potential for irrigated farming with land leveling (USDOA, 1981).

3.13.1.4 Seismicity

Faults are fractures in the crust of the earth along which bedrock is displaced or offset as a result of pressures within the earth. An active fault is one where displacement has occurred within the last 11,000 years or so, which is a period in time that is referred to as the Holocene Epoch.

Earthquakes are vibrations of the earth caused by sudden movement of the bedrock on either side of an active fault. The vibration of the earth results when bedrock on either side of the fault breaks loose from its original position and then snaps into a new position. In the process of rebounding, vibrations called seismic waves are generated. The primary effect of earthquakes is the violent ground motion accompanying movement along a fault. Secondary effects include ground rupture; landslides; tsunamis (i.e., tidal waves); lurching; regional or local subsidence of the land; and liquefaction. Liquefaction is a geologic process in which soil that is saturated loses its strength or stiffness as a result of increased pore pressures resulting from ground shaking during earthquakes. Liquefaction is most likely to occur in

recent geologic deposits, especially sandy soils, that have a high groundwater table.

The Plan Area is located to the east of the zone of major historic recorded seismic activity in Southern California. The western portion of Southern California is more seismically active because of the basic differences in the geological environment between the western and eastern portions of Southern California. In addition, the number and length of the active faults decrease from west to east within the western portion of Southern California.

The Imperial Valley is at the southern end of the San Andreas fault system, probably the most studied and best known fault system in the United States. The San Andreas system transects the northeastern margin of the Imperial Valley approximately 60 miles northwest of the Plan Area. Other major Holocene Epoch faults within the region include several faults that parallel, or are "en echelon" to, the southern section of the San Andreas fault. Most notably, these faults are the reported East Mesa fault, the East Highline Canal lineament, the Imperial-Brawley Seismic Zone, the Superstition Hills fault (San Jacinto fault Zone), and the Elsinore fault. Some geologic references for the area also indicate the possible existence of a postulated fault (Sand Hills fault) beneath the Algodones Sand Dunes, which may represent the inactive eastern boundary of the Salton Trough spreading center. No evidence has been documented to indicate that the Sand Hills fault has been active in Holocene time. The active faults currently associated with the eastern boundary of the Salton Trough are now coincident with the East Mesa fault and possibly the East Highline Lineament (Imperial Environmental Impact Statement, 1997).

3.13.2 Energy Resources

As of 1987, several oil and gas leases had been issued, mainly in the class L (limited use) area of the central dunes, the Glamis/Gecko Open Area, and in the North Algodones Dunes Wilderness. Leasing took place within the WSA in 1981 and 1982, prior to a moratorium on WSA leasing. Development of oil and gas resources is low due to geologic conditions.

Two Known Geothermal Resource Areas (KGRAs) underlie the recreation area, the Glamis KGRA and the Dunes KGRA. Figure 3.13-1 shows these areas. The geothermal potential is considered fair for high temperature electrical power generation and excellent for low temperature applications. The Glamis KGRA occupies a corridor along SR-78, extending up to 2 miles north and 3 miles south of the highway. The northern portion of the "Glamis" KGRA extends into the North Algodones Dunes Wilderness. The "Dunes" KGRA occupies 16 sections of East Mesa and adjacent dunes in the southern portion of the Plan Area.

3.13.3 Mineral Resources

The principal mineral resources are sand and gravel. The blowsand of the main dune system is occasionally used for fill material. Alluvial sand and gravel deposits east of Glamis are extracted for road base material. Permits for the extraction of sand and gravel have been proposed for Class I land, not WSAs or Class L land. All sand and gravel sales activity is found on the Glamis-Boardmanville Class M lands. Mining claims are also located in the

Class M lands. No mineral extraction has occurred in these areas, and potential for practical extraction appears to be low (BLM, 1987; CDC, 1980).

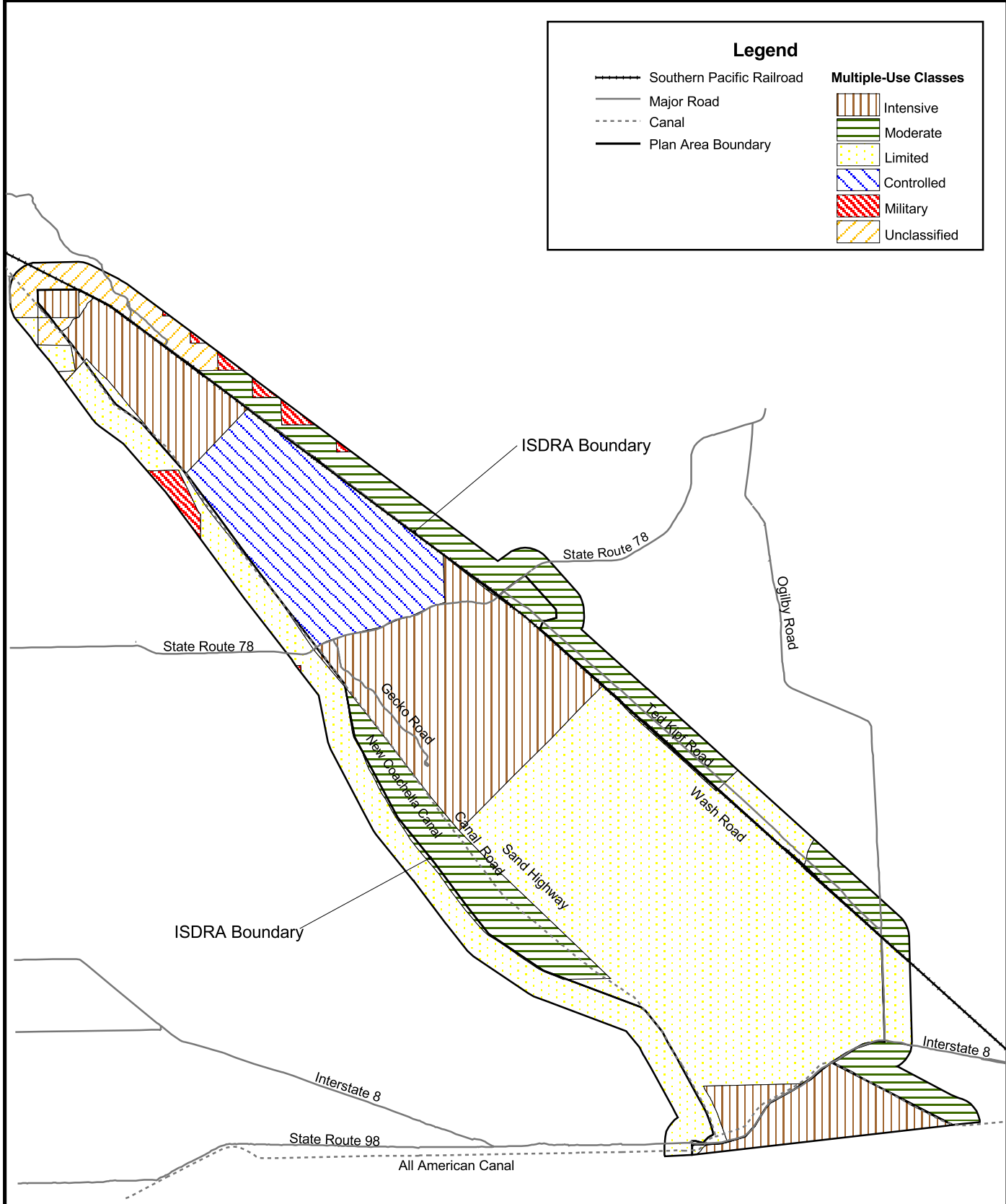

Figure 3.1-1
California Desert Conservation Area
Multiple-Use Classes
Imperial Sand Dunes Recreation Area - DEIS

0 2 4 6 Miles

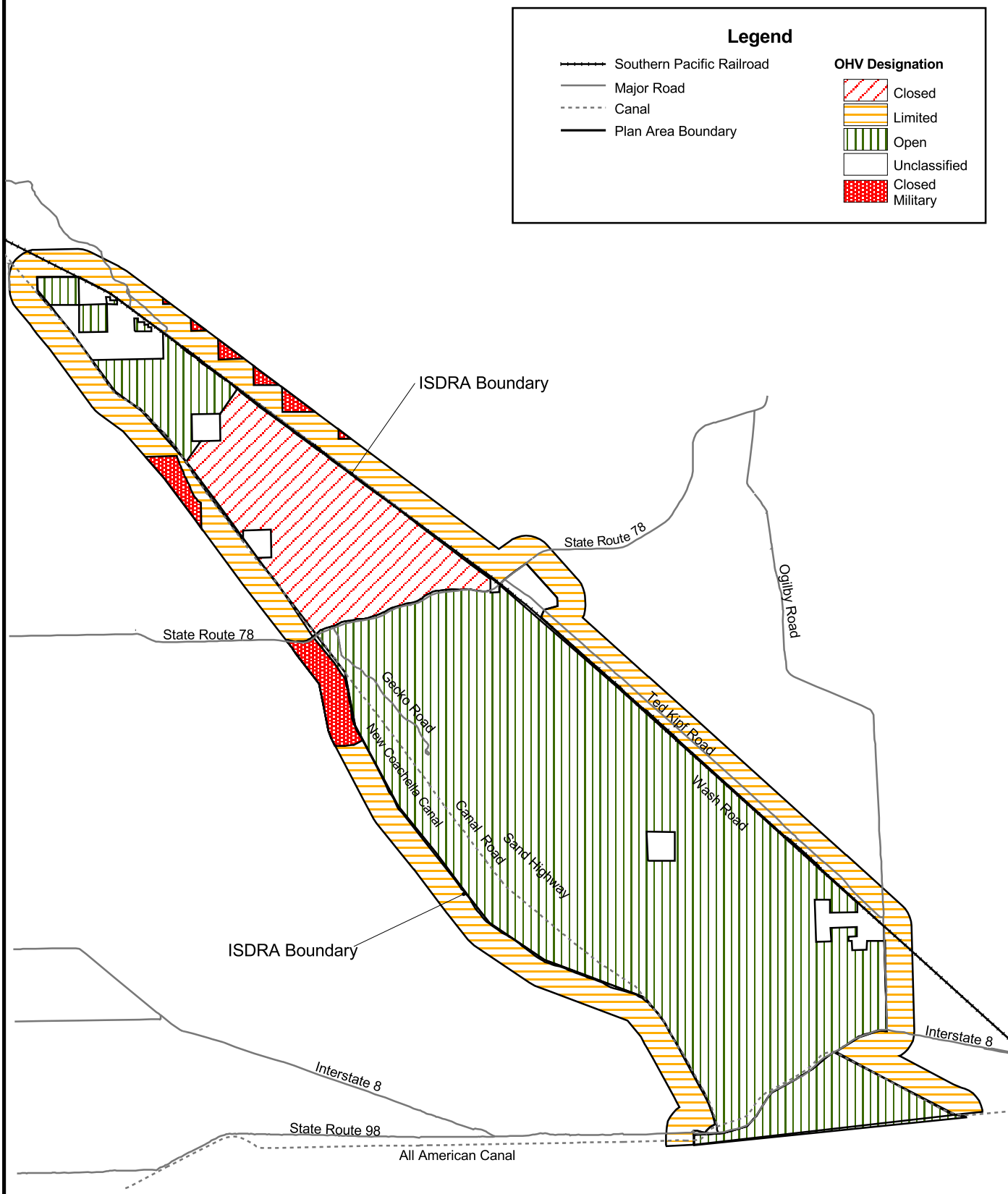

Figure 3.1-2
OHV Designations
Imperial Sand Dunes Recreation Area - DEIS

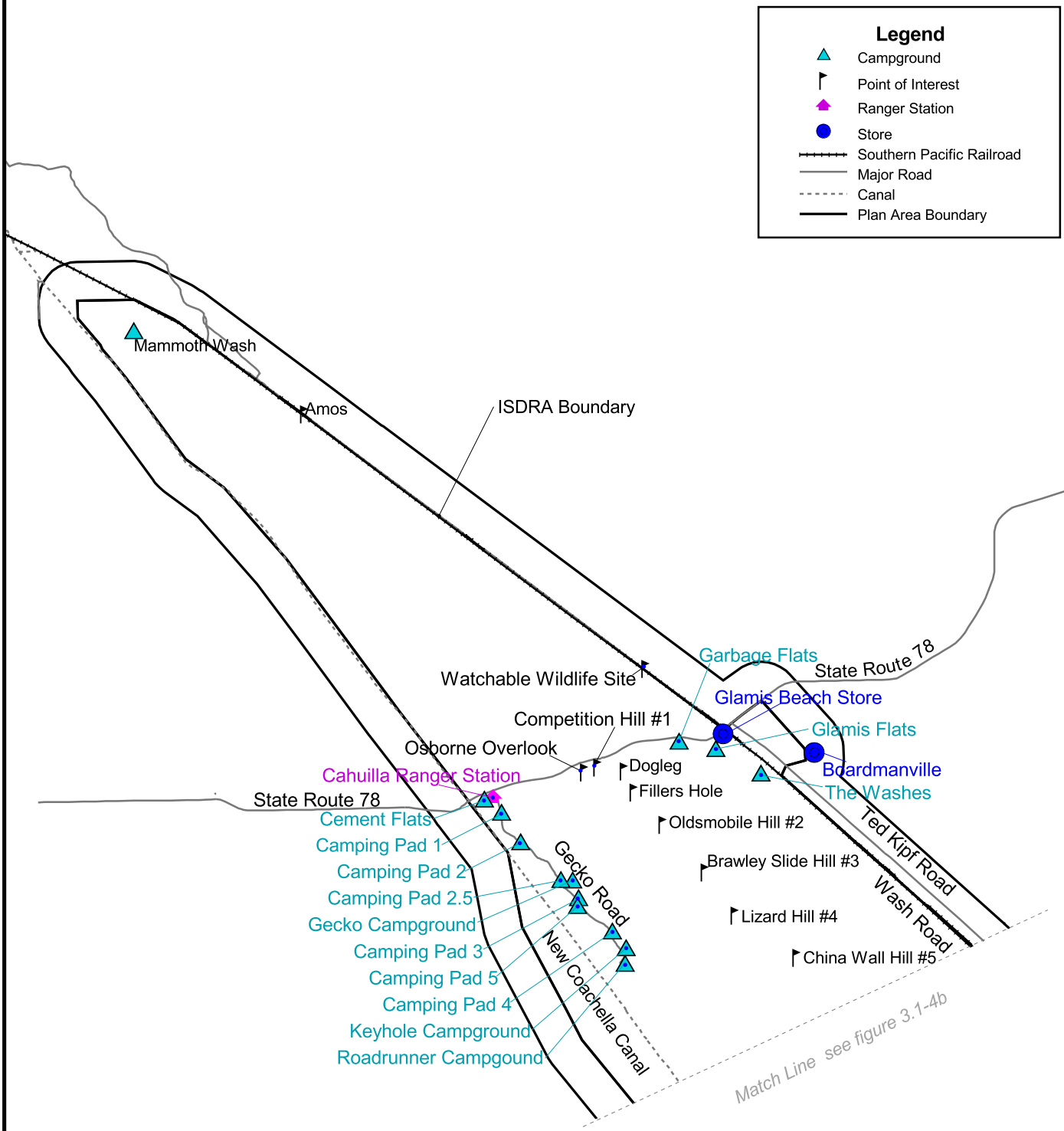

Figure 3.1-3a
Existing Recreation Facilities - North
Imperial Sand Dunes Recreation Area - DEIS

N

0 1 2 3 Miles

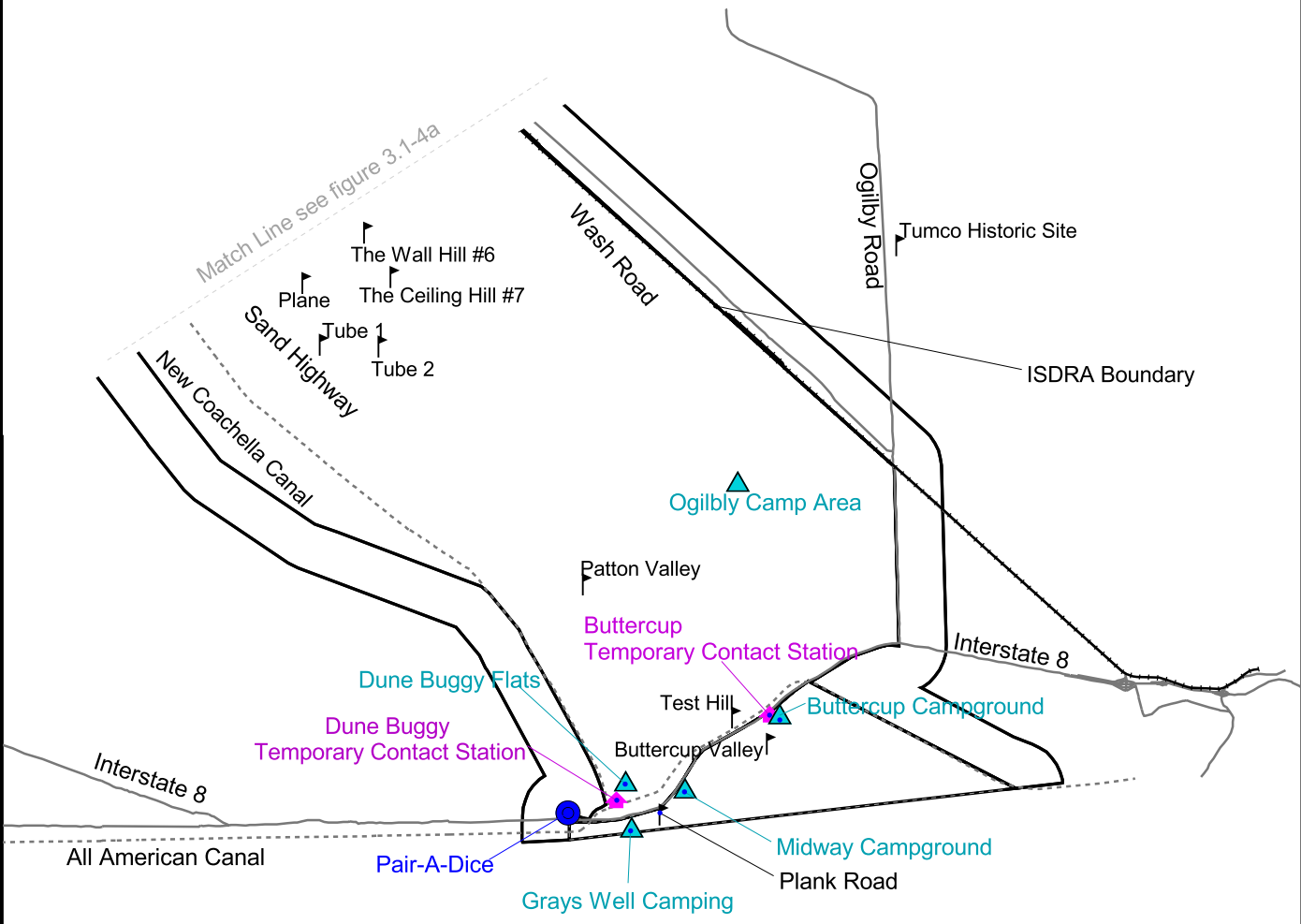

Figure 3.1-3b
Existing Recreation Facilities - South
Imperial Sand Dunes Recreation Area - DEIS

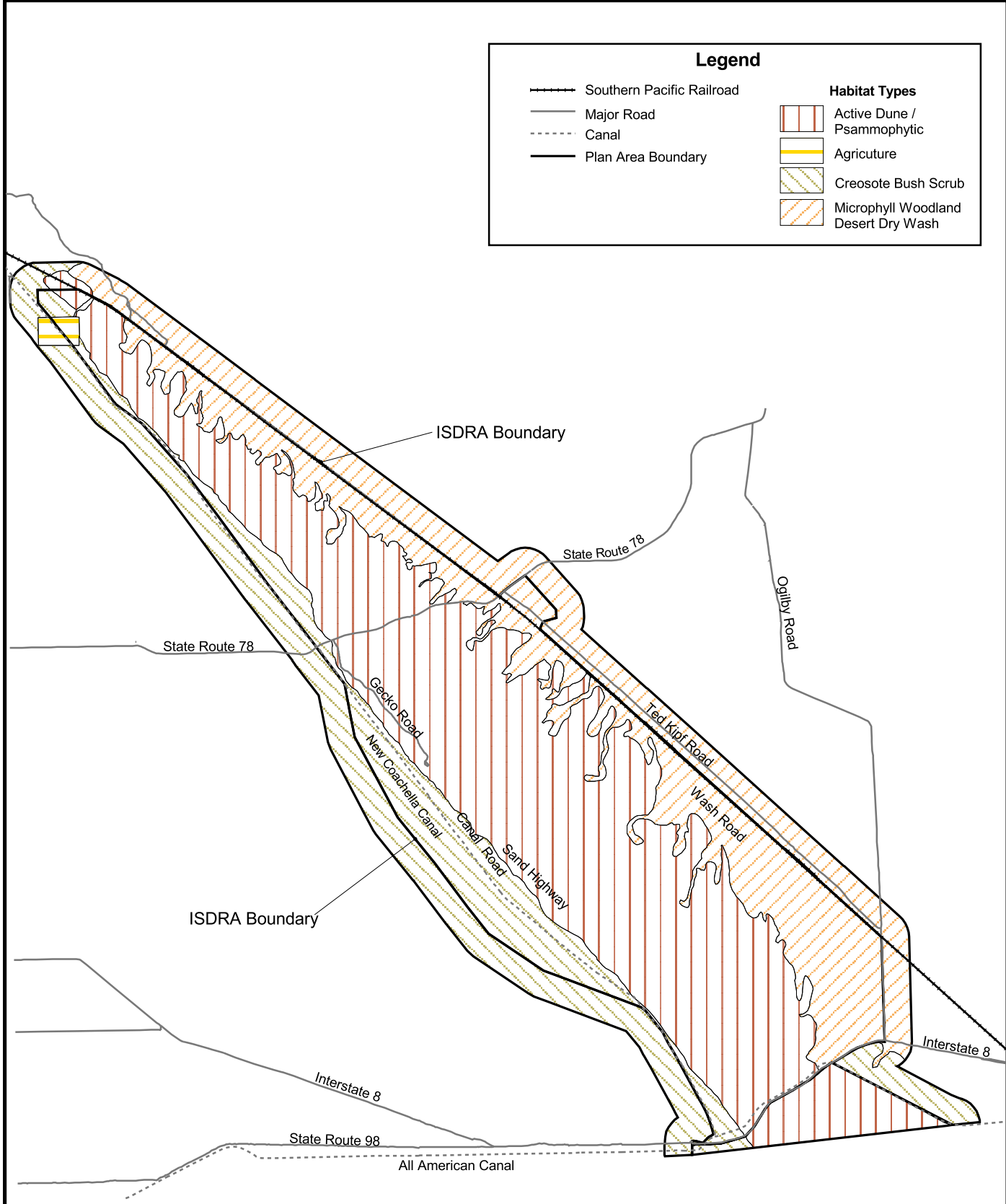

Figure 3.2-1
Habitat Types
Imperial Sand Dunes Recreation Area - DEIS

N

0 2 4 6 Miles

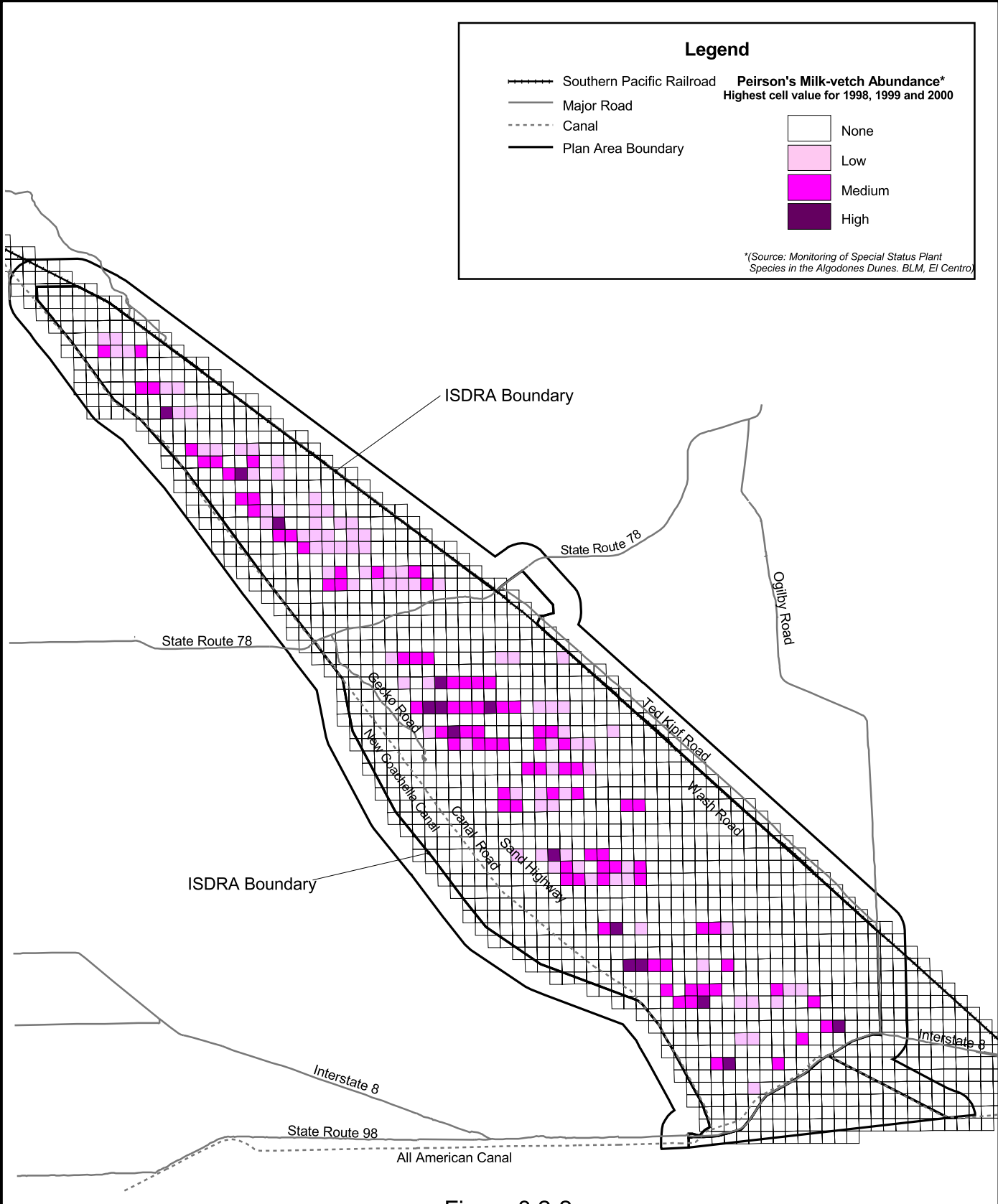

Figure 3.2-2
Peirson's Milk-vetch Distribution
Imperial Sand Dunes Recreation Area - DEIS

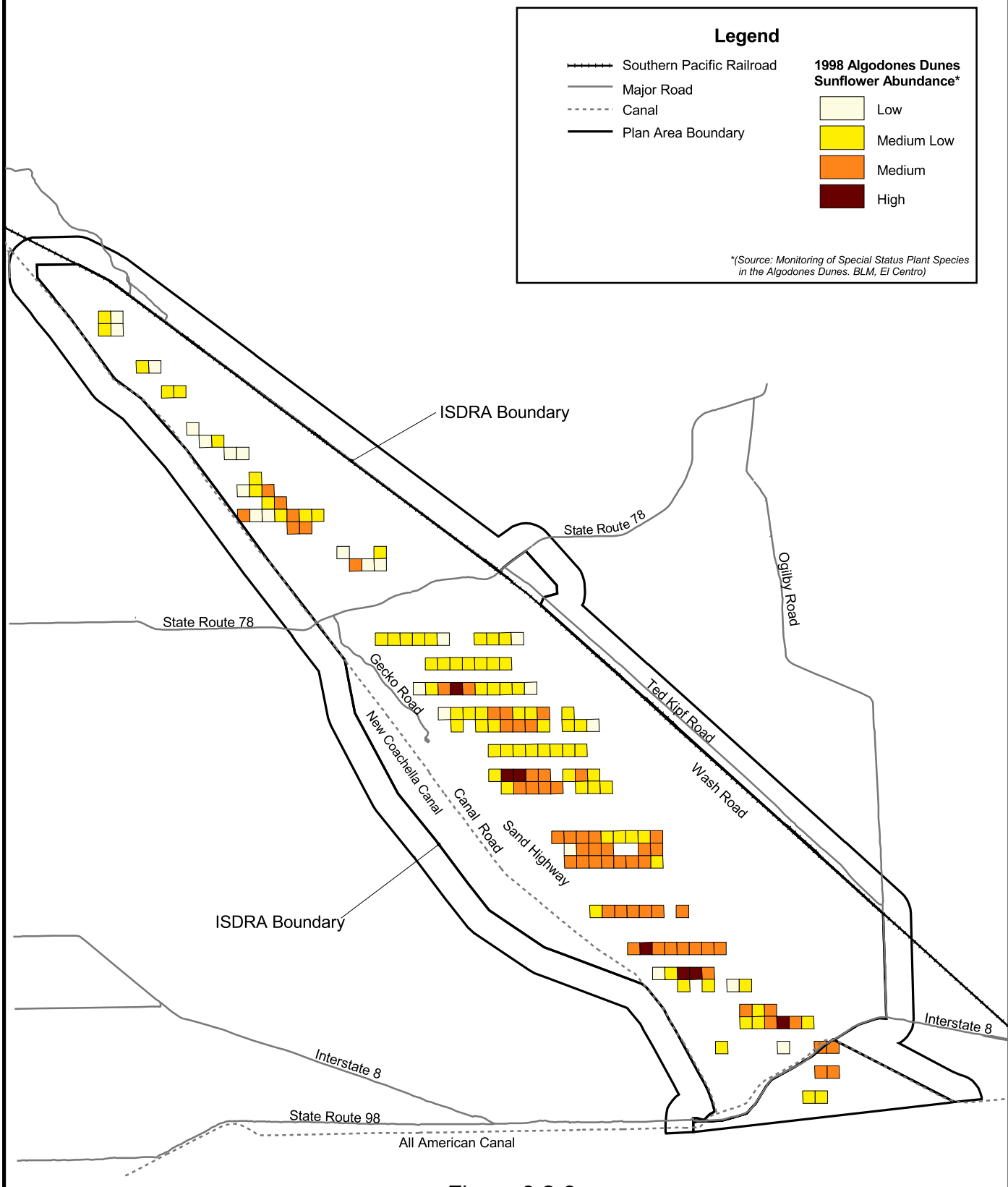

Figure 3.2-3
Algodones Dunes Sunflower Distribution (1998)
Imperial Sand Dunes Recreation Area - DEIS

0 2 4 6 Miles

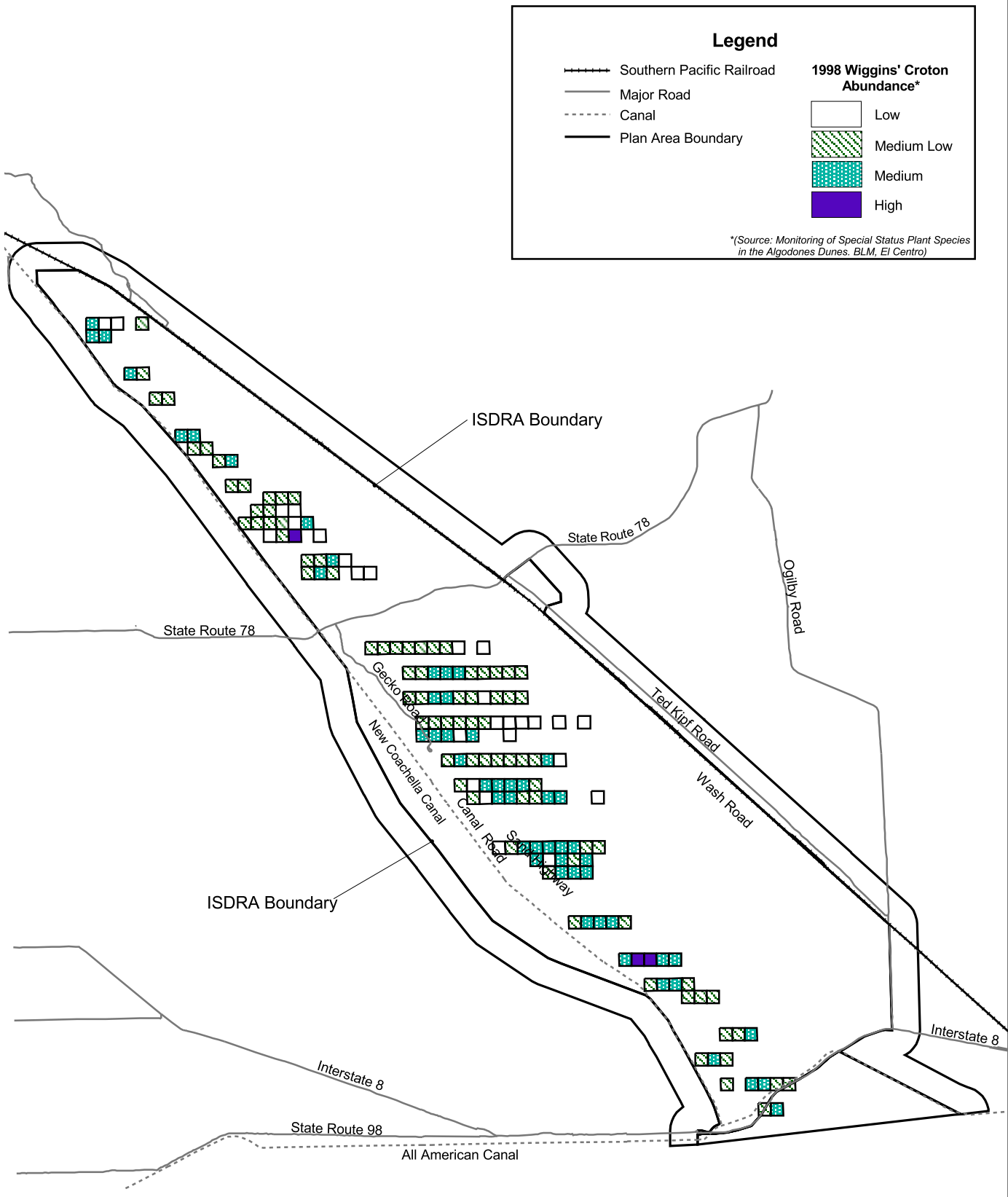

Figure 3.2-4
Wiggins' Croton Distribution (1998)
Imperial Sand Dunes Recreation Area - DEIS

N

0 2 4 6 Miles

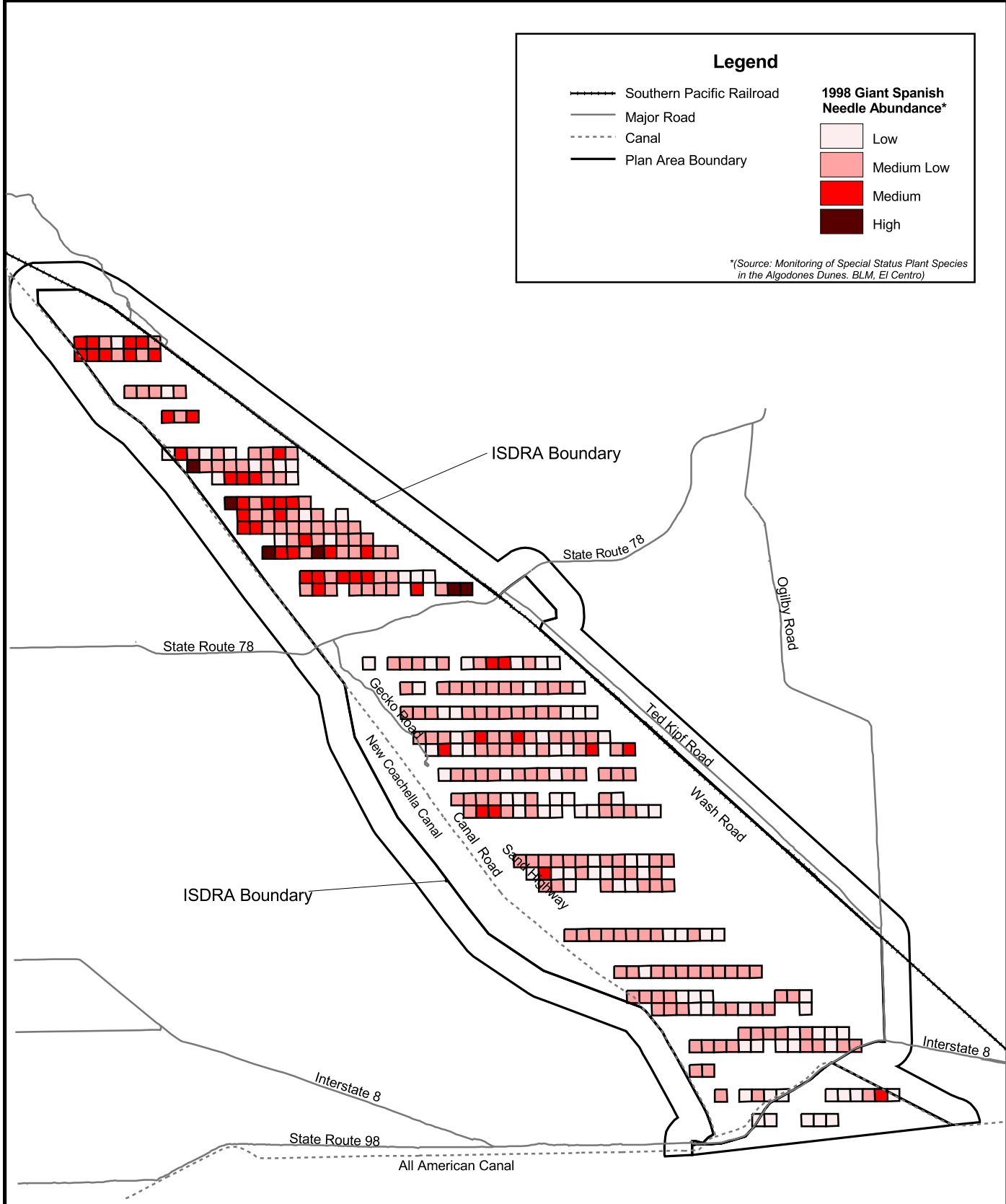

Figure 3.2-5
Giant Spanish Needle Distribution (1998)
Imperial Sand Dunes Recreation Area - DEIS

N

0 2 4 6 Miles

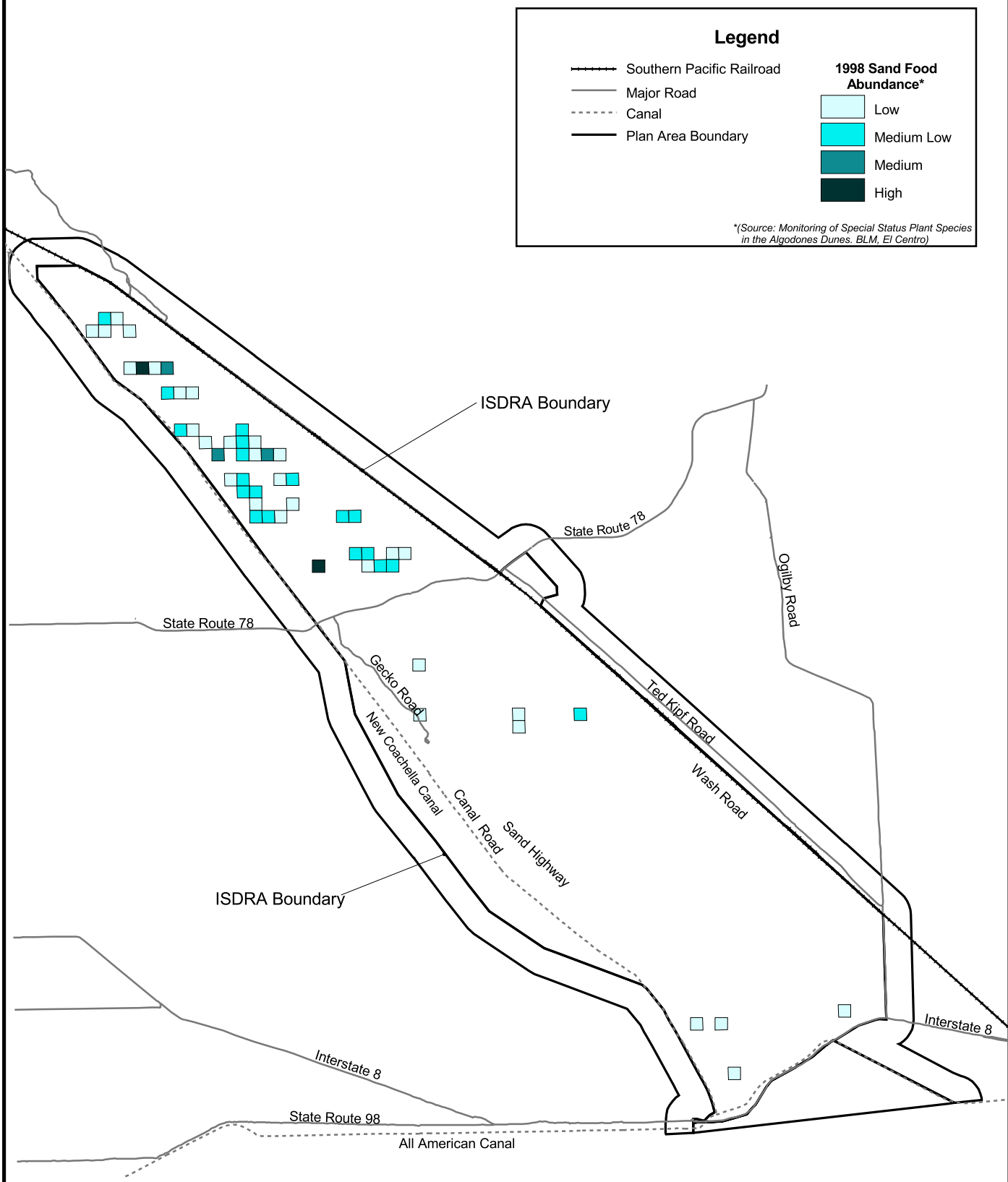

Figure 3.2-6
Sand Food Distribution (1998)
Imperial Sand Dunes Recreation Area - DEIS

0 2 4 6 Miles

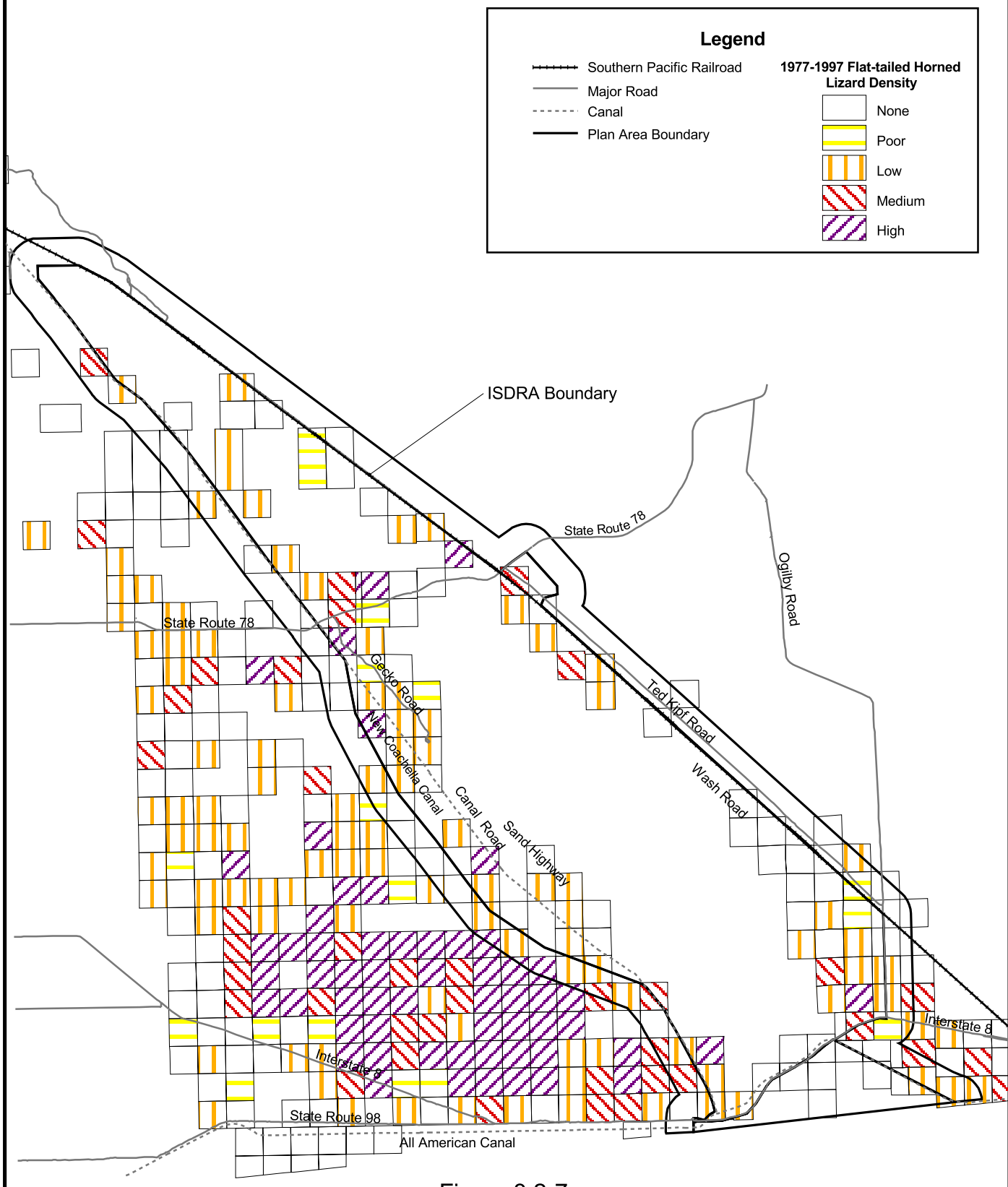

Figure 3.2-7
Flat-tailed Horned Lizard Distribution (1977-1997)
Imperial Sand Dunes Recreation Area - DEIS

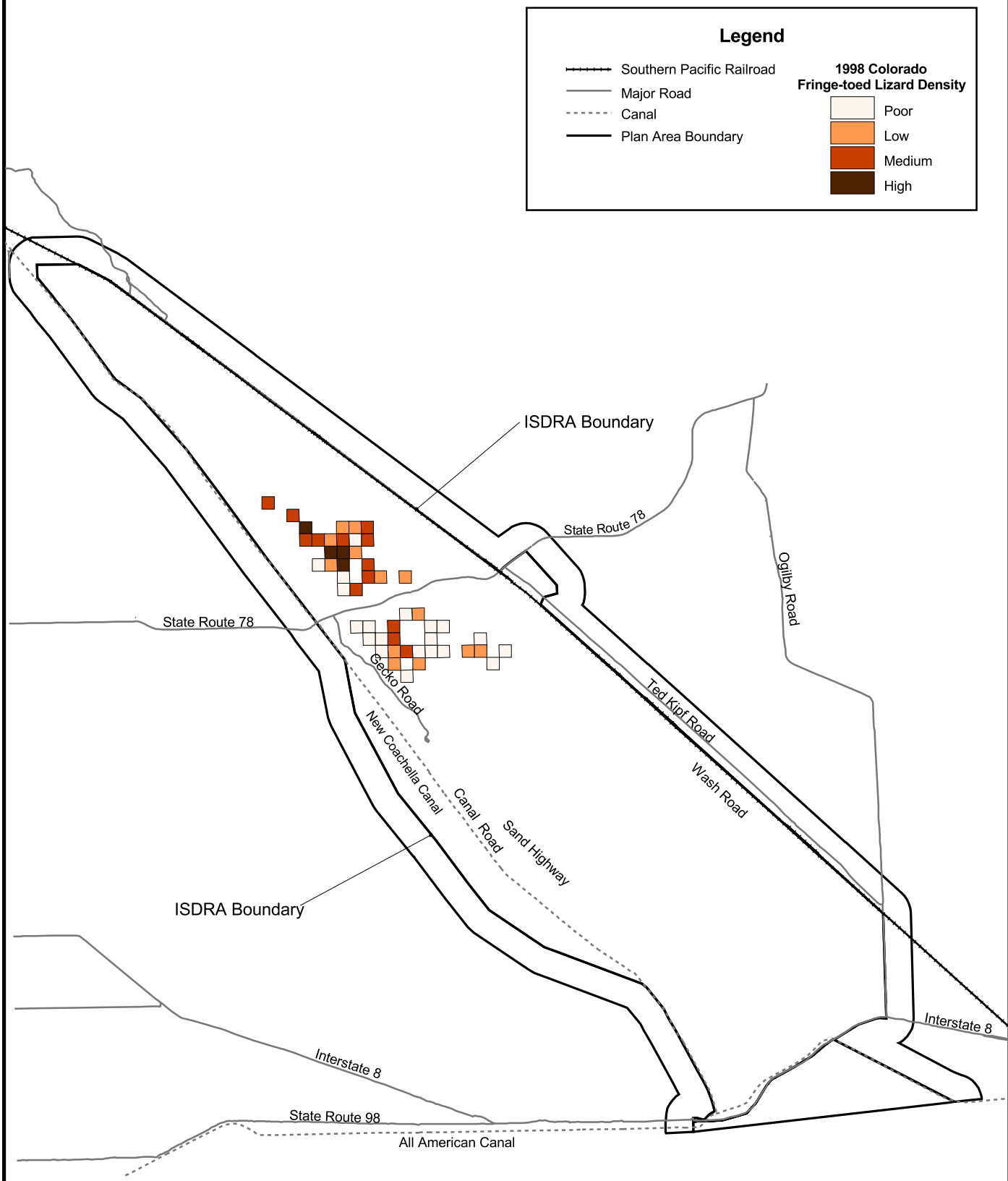

Figure 3.2-8
Colorado Fringe-toed Lizard Distribution (1998)
Imperial Sand Dunes Recreation Area - DEIS

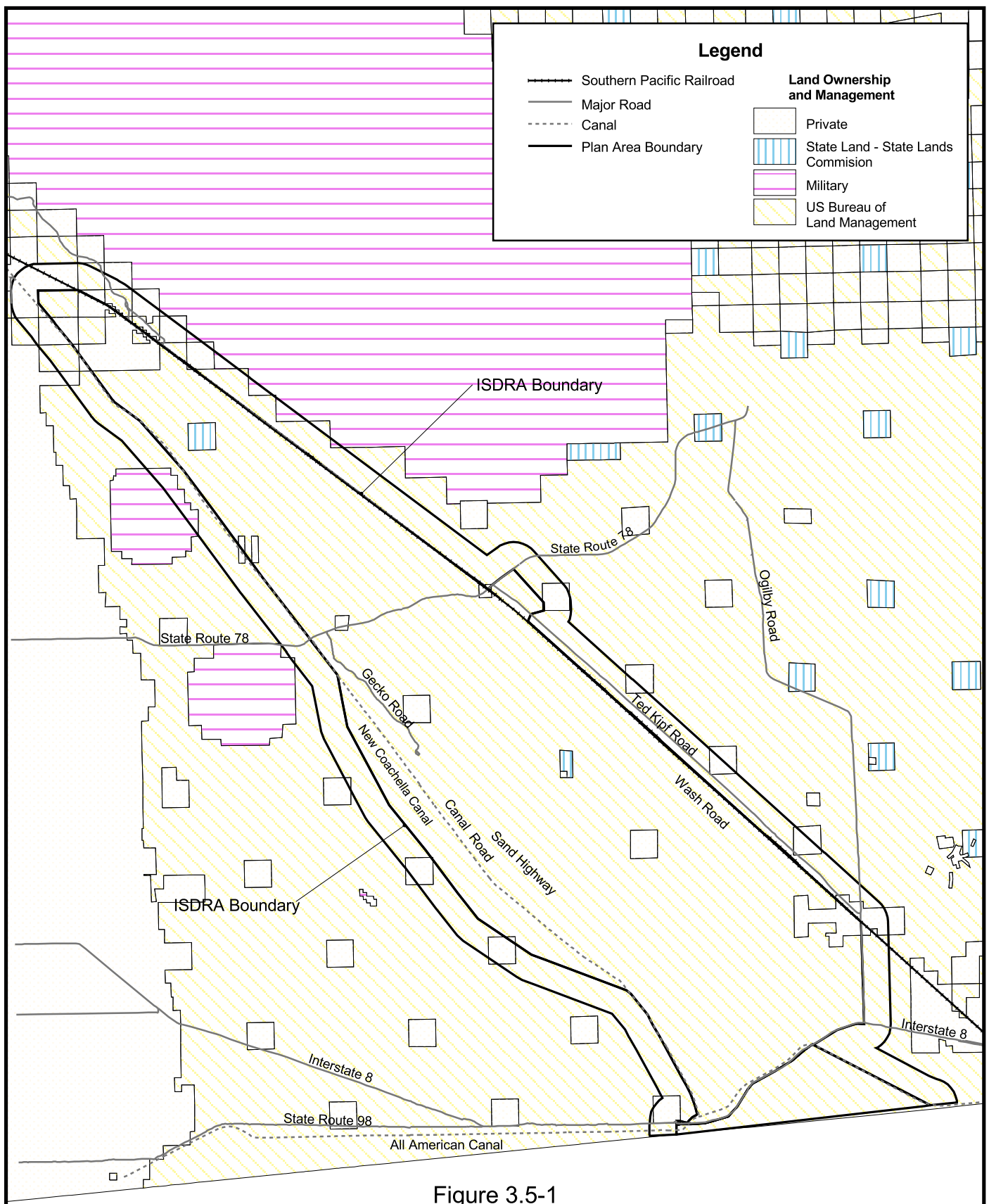

Figure 3.5-1
Land Ownership and Management
Imperial Sand Dunes Recreation Area - DEIS

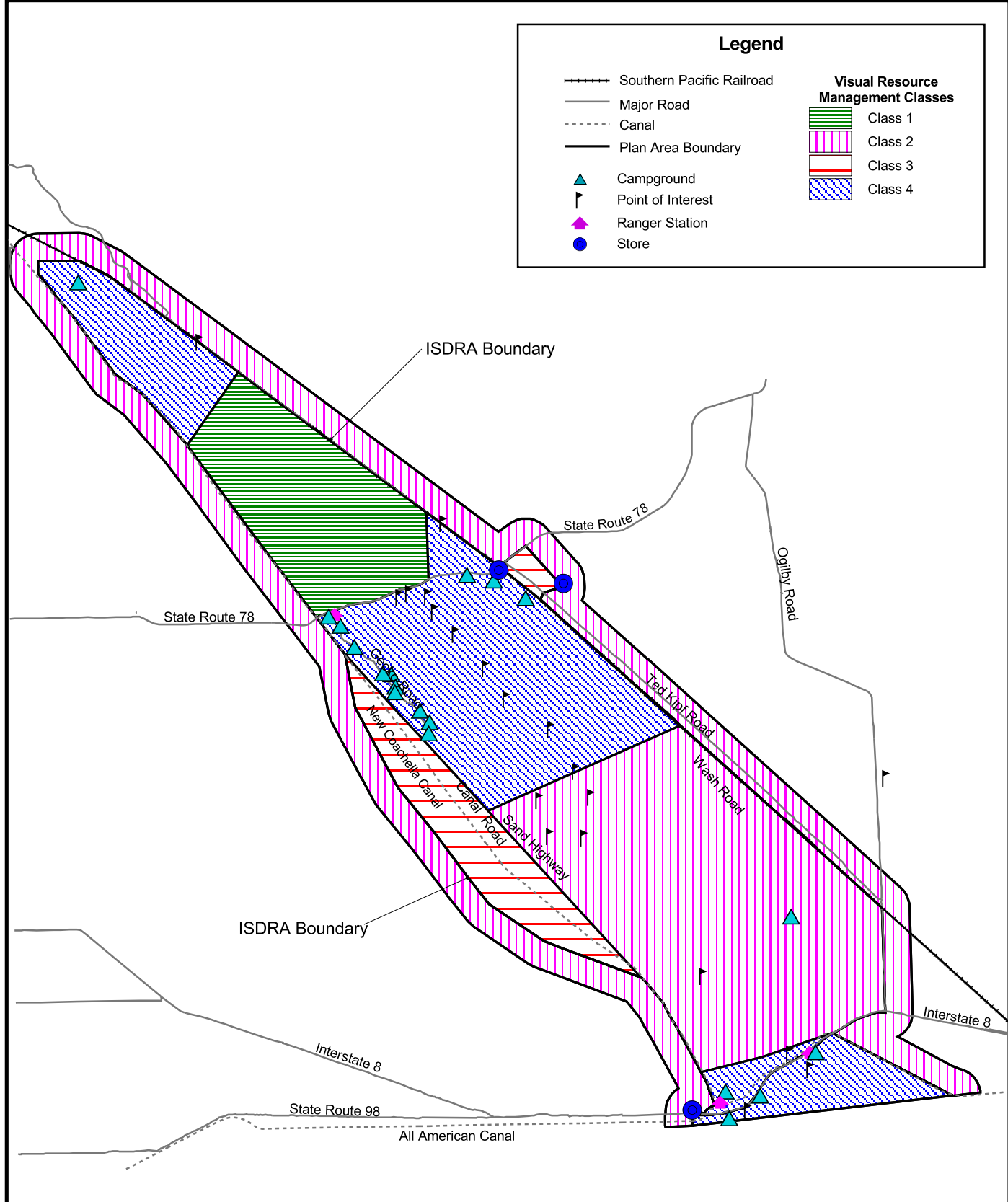

Figure 3.6-1
Visual Resource Management Areas by MUC
Imperial Sand Dunes Recreation Area - DEIS

0 2 4 6 Miles

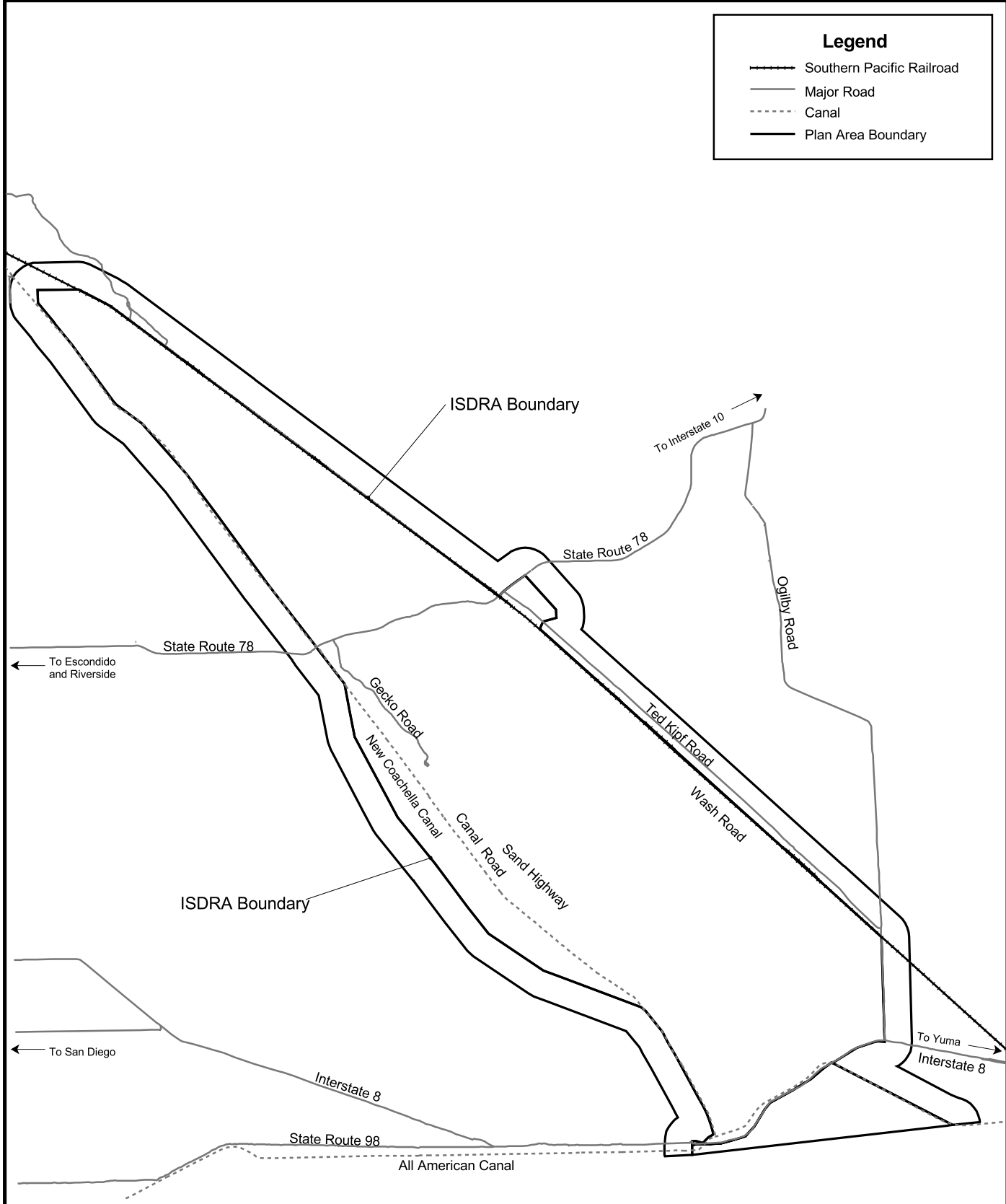

Figure 3.9-1
Existing Access
Imperial Sand Dunes Recreation Area - DEIS

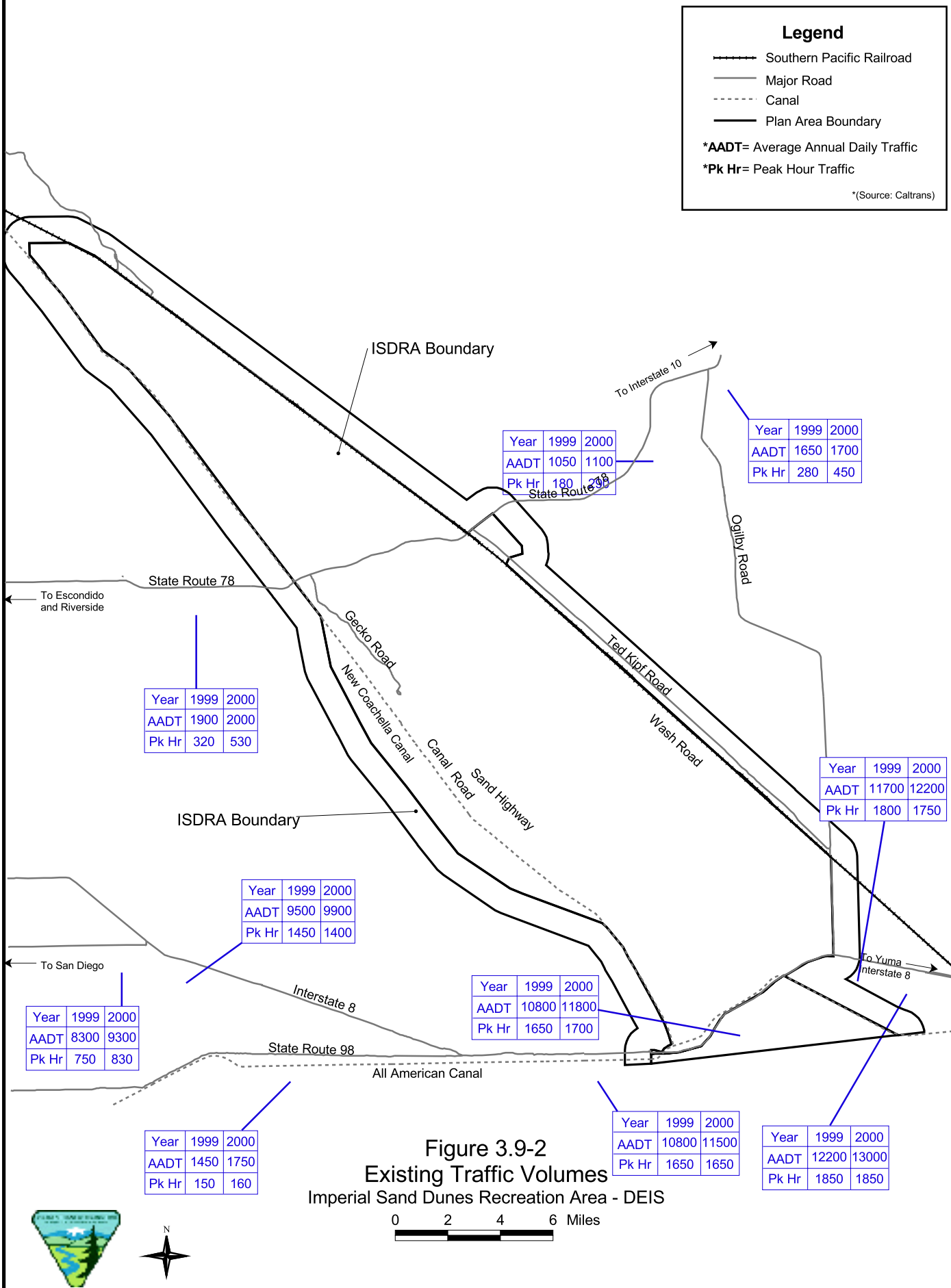

Figure 3.9-2
Existing Traffic Volumes
Imperial Sand Dunes Recreation Area - DEIS

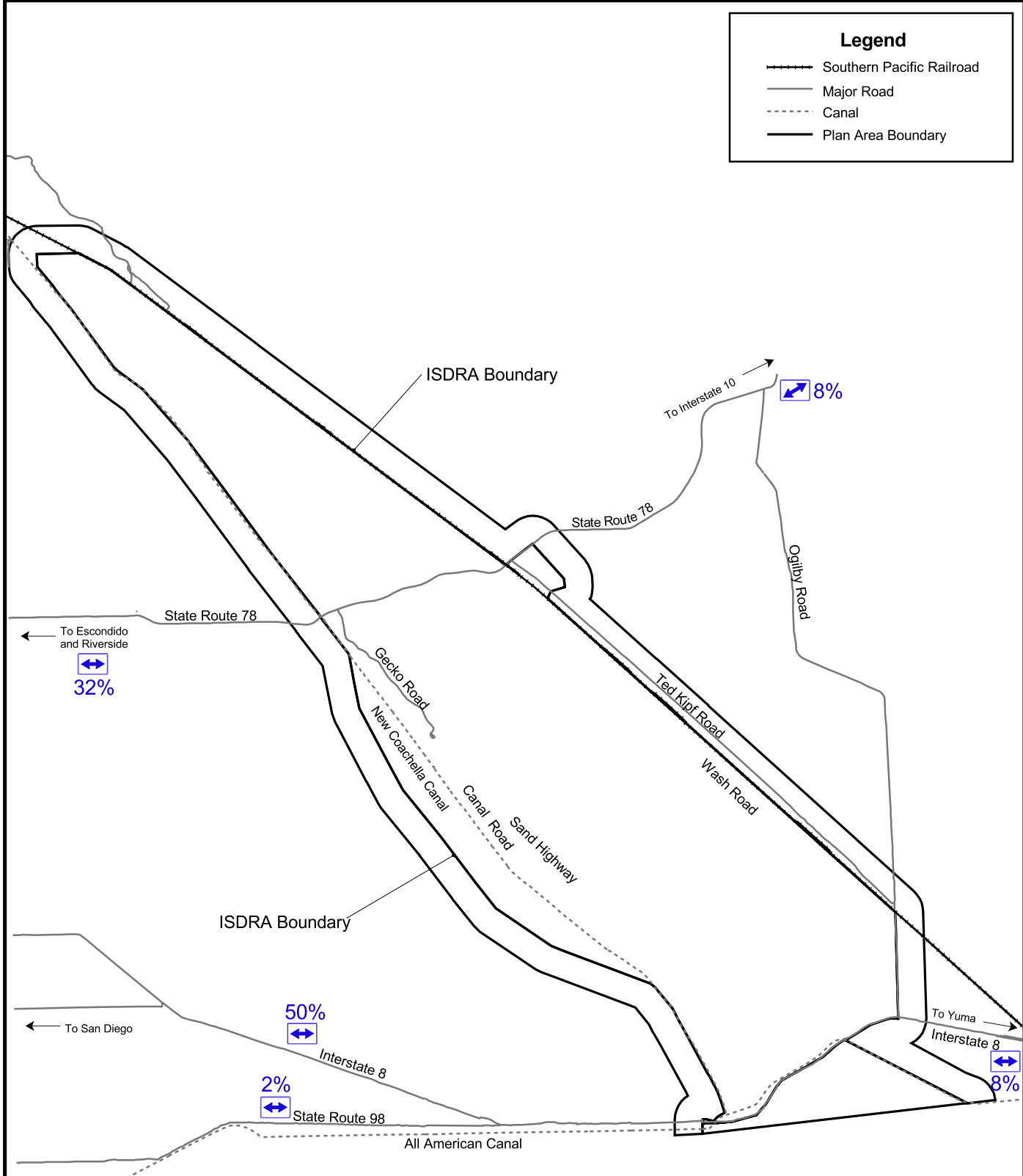

Figure 3.9-3
Distribution of Existing Traffic*
Imperial Sand Dunes Recreation Area - DEIS

*(Source: ACT)

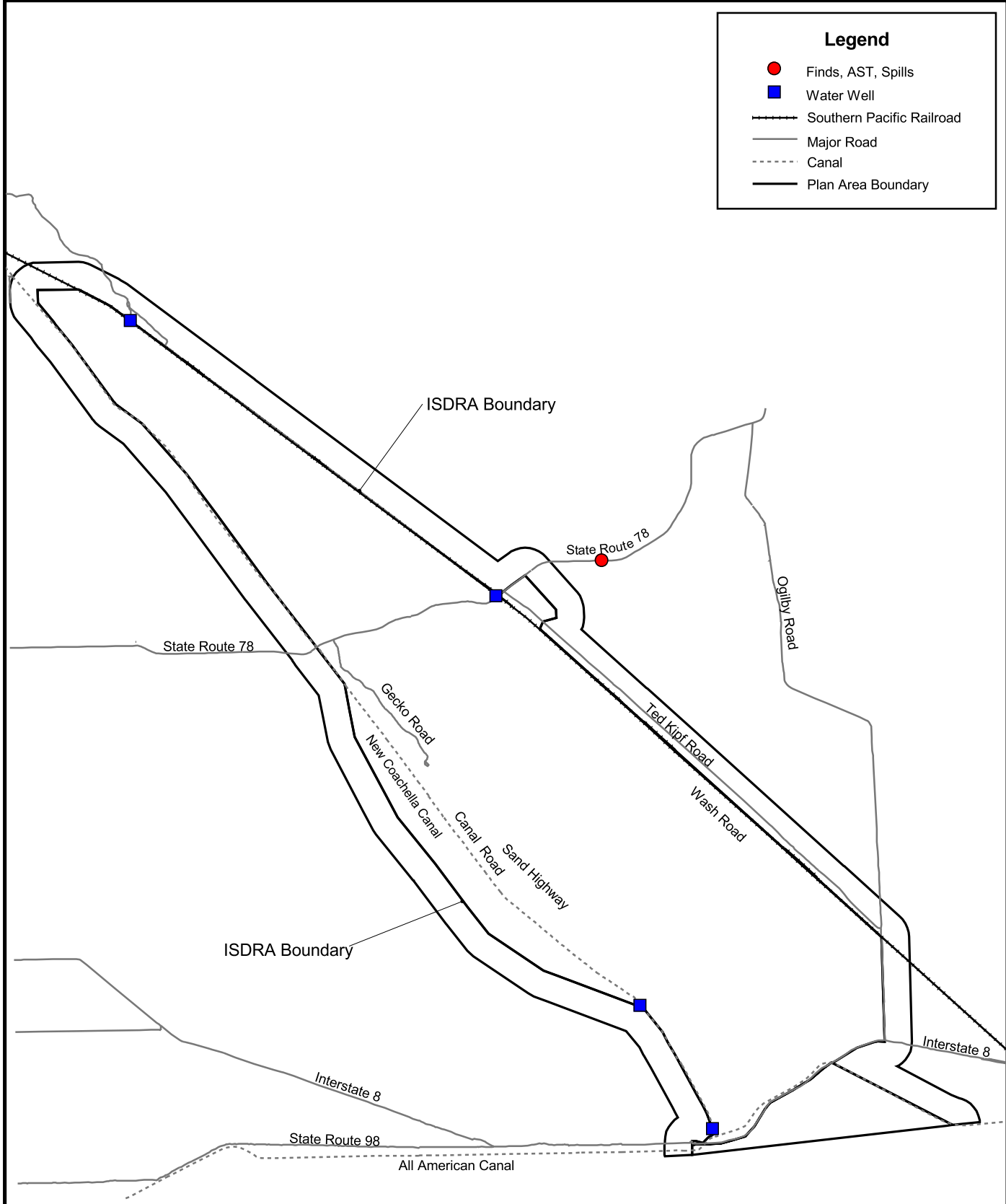

Figure 3.12-1
Potential Hazards
Imperial Sand Dunes Recreation Area - DEIS

0 2 4 6 Miles

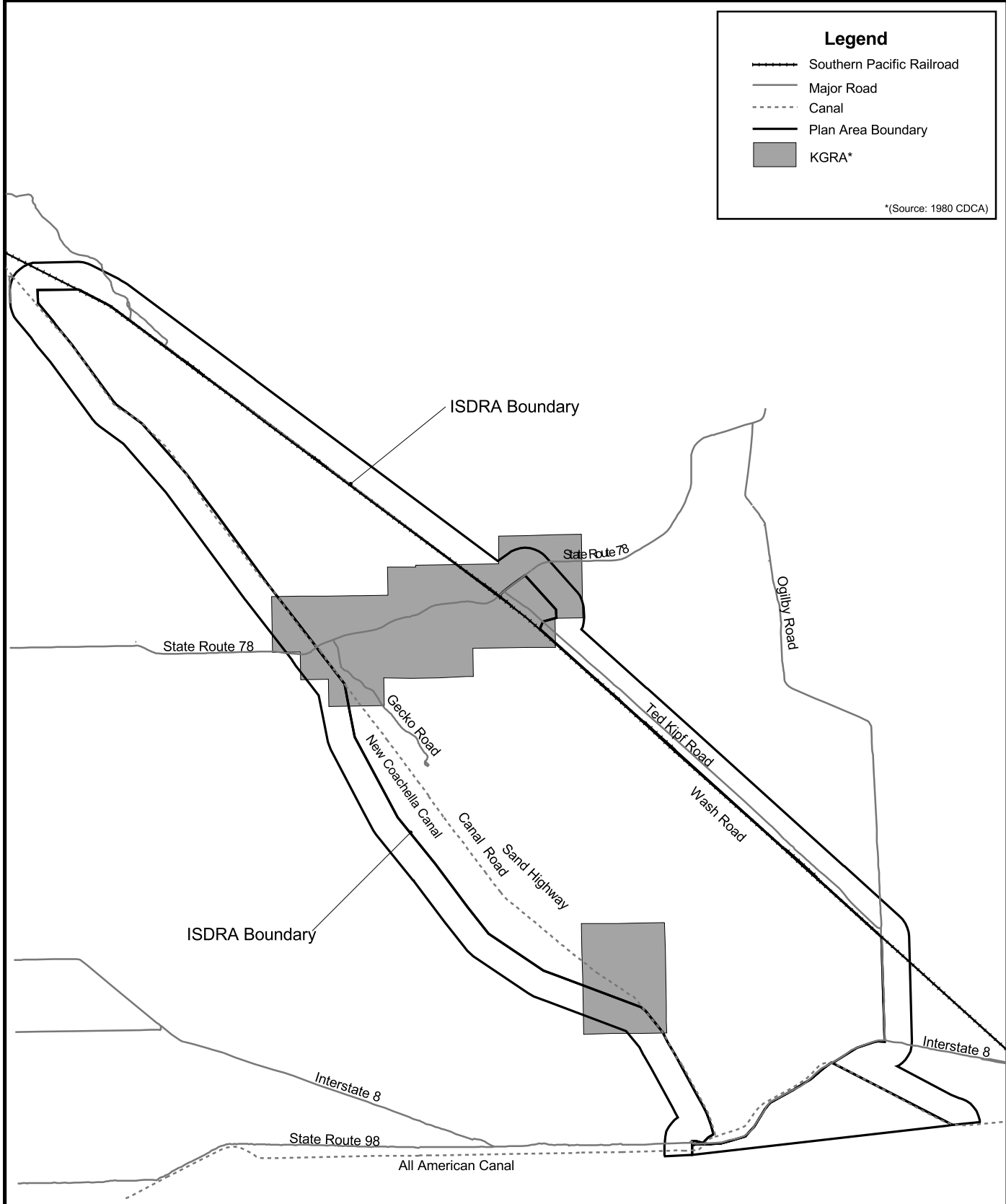

Figure 3.13-1
Known Geothermal Resource Areas (KGRAs)
Imperial Sand Dunes Recreation Area - DEIS