

CHAPTER 3.0

Affected Environment

3.1 Introduction

The Secretary of the Interior designated the Imperial Sand Hills Recreation Lands in 1972. The BLM also prepared a recreation management plan for the area in 1972. The Planning Area, which contains the ISD SRMA, is a unique recreation resource in the southwestern United States. The sand dune system within the Planning Area is of a size and height that is unparalleled. The Planning Area fills a unique and valued niche for providing a wide spectrum of recreation opportunities, including OHV recreation opportunities.

The dunes are bordered on the west by the New Coachella Canal, which delivers Colorado River water to the agricultural industry of the Coachella Valley to the north and west. A major route of the UPRR traverses the eastern edge of the Planning Area. SR-78 divides the northern third of the Planning Area from the southern portion. I-8 traverses the southern portion of the Planning Area. Ogilby Road runs north-south between SR-78 and I-8 along the southeast portion of the Planning Area. Mammoth Wash runs through the ISD SRMA to the north. The Planning Area is shown in Map1-1.

This chapter describes the environmental components of BLM-administered lands in the Planning Area that would potentially be affected by implementation of the Proposed RAMP/CDCA Plan Amendment. This chapter is organized by resources, special designations, public health and safety, resource uses, social and economic considerations, and environmental justice conditions. Resources include air, soil, water, vegetative communities, wildlife, special status species, wildland fire ecology and management, and cultural, paleontological, and visual resources. Special designations include ACECs and the wilderness. Resource uses include lands and realty, minerals, recreation management, and transportation and public access.

Information sources and analysis data used to write this chapter were obtained from various management planning documents from BLM. Information and data were also collected from many other related planning documents and research publications prepared by various federal and state agencies, as well as from private publications pertaining to the resources found within the Planning Area, key resource conditions, and resource uses. The purpose of this chapter is to provide a description of key resources found within the existing environment of the Planning Area, which will be used as a baseline to evaluate and assess the impact of the eight resource management

alternatives. Descriptions and analyses of the impacts themselves are presented in Chapter 4—Environmental Consequences.

3.2 Multiple Use Classes

The BLM manages the lands within the Planning Area according to the MUCs listed in the CDCA Plan. The CDCA Plan established four MUC guidelines and plan elements for specific resources or activities such as motorized-vehicle access, recreation, and vegetation. These MUCs are:

- Class C (Controlled Use): These lands are to be preserved in a natural state; and access generally is limited to non-motorized, non-mechanized means (e.g., by foot or horseback). Competitive events will be prohibited in Class C lands, and certain areas already closed to motorized vehicles will remain closed; otherwise, vehicle access will be restricted to approved routes of travel.
- Class L (Limited Use): These lands are managed to protect sensitive, natural, scenic, ecological, and cultural resource values. They provide for generally lower intensity and carefully controlled multiple uses that do not significantly diminish resource values. Access to Class L lands is closed unless specifically designated as open. Class L lands may be accessible by motorized vehicles, as routes are approved through a public participation process.
- Class M (Moderate Use): These lands are managed in a controlled balance between higher intensity use and protection. A wide variety of uses, such as mining, livestock grazing, recreation, and energy and utility development are allowed. Any damage caused by permitted uses must be mitigated. Access to Class M lands is open unless specifically designated as closed.
- Class I (Intensive Use): These lands are managed for concentrated use to meet human needs. Reasonable protection is provided for sensitive natural values, and mitigation of impacts and rehabilitation of impacted areas will occur when possible.

The Planning Area as currently managed contains all four MUCs, as described in Table 2-2 and shown in Map 2-1.

3.3 Air and Atmospheric Values

3.3.1 Climate and Meteorology

The Planning Area is located within the Lower Colorado River Valley subdivision of the Sonoran Desert, which is classified as a dry tropical climate (Brown 1994). The Planning

Area is located in Imperial County, which is in the Salton Sea Air Basin (SSAB). The climate of Imperial County exhibits characteristics typical of the Sonoran Desert: low annual precipitation, very hot summers, mild winters, high evaporation rates, low humidity, and strong inversions. One of the main determinants of climatology is a semi-permanent 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 blocking effects of the mountains limit rainfall (Imperial County 2008a).

In Imperial County, annual precipitation fluctuates widely from about 1 to 6 inches, averaging 2.97 inches annually (Imperial County 2007). Temperature ranges from lows around 30°F in January to highs around 110°F in July and August. Mean low temperature is 55°F, and mean high temperature is 90°F (Imperial County 2007). Winter daytime highs are in the 60°F–70°F range from December through March, and freezing temperatures are rare.

The flat terrain of Imperial County and the strong temperature differentials created by intense solar heating produce moderate winds and deep thermal convection. The Imperial Valley region occasionally experiences periods of high winds. Winter winds approach from the northwest. Summer winds are more variable, but often blow from the southeast.

A common atmospheric condition known as a temperature inversion affects air quality in the Planning Area. An inversion acts like a lid, keeping normal convective overturning of the atmosphere from penetrating through the inversion. This can cause several weather-related effects, such as the trapping of pollutants below the inversion and allowing them to build up. The inversion layer can persist for one 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 (Imperial County 2008a).

3.3.1.1 Climate Change

On September 14, 2009, Secretary of the Interior Ken Salazar issued SO 3289, addressing the impacts of climate change on domestic water, land, and other natural and cultural resources. The SO establishes an approach for increasing understanding of climate change and responding to potential climate change-related impacts as relevant to the resources that the DOI manages. The document specifically identifies areas such as potential changes in flood risk and water supply, sea level rise, changes in wildlife and habitat populations and their migration patterns, new invasions of exotic species, and increased threat of wildland fire. The SO includes Climate Change Response

Planning Requirements, which require each bureau and office within the DOI (including BLM) to consider and analyze potential climate change impacts when undertaking long-range planning exercises, setting priorities for scientific research and investigations, developing multi-year management plans, and making major decisions regarding potential use of resources under the DOI's purview.

Climate change is influencing western lands and resources in many ways. As average temperatures rise, droughts increase, snowpack declines, and water supplies diminish in key areas. Arctic permafrost is thawing. Wildfires have become larger and more frequent. Noxious weeds and invasive species crowd out native plants and wildlife.

These changes undermine the ecological health of BLM-managed lands and impact our quality of life. Healthy public lands produce vital water supplies and natural resources for energy, food, and shelter. They also provide valued recreation opportunities, and places of solitude and beauty which nurture and replenish our spirit. These core values and benefits are threatened by environmental changes underway.

Ongoing scientific research has identified the potential impacts of anthropogenic (human-made) greenhouse gas (GHG) emissions and changes in biological carbon sequestration due to human activities on global climate. Through complex interactions on a regional and global scale, these GHG emissions and net losses of biological carbon sinks cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into space. Although GHG levels have varied for millennia, recent industrialization and burning of fossil carbon sources have caused concentrations of CO₂ equivalents to increase dramatically and are likely to contribute to overall global climatic changes. The Intergovernmental Panel on Climate Change (IPCC) recently concluded that "warming of the climate system is unequivocal" and "most of the observed increase in globally average temperatures since the mid-twentieth century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations" (IPCC 2007).

Global mean surface temperatures have increased nearly 1.8°F from 1890 to 2006. Models indicate that average temperature changes are likely to be greater in the Northern Hemisphere. Northern latitudes (above 24° N) have exhibited temperature increases of nearly 2.1°F since 1900, with nearly a 1.8°F increase since 1970 alone. Without additional meteorological monitoring systems, it is difficult to determine the spatial and temporal variability and change of climatic conditions, but increasing concentrations of GHGs are likely to accelerate the rate of climate change.

In 2001, the IPCC (IPCC 2001) indicated that by the year 2100, global average surface temperatures would increase 2.5 to 10.4°F above 1990 levels. The National Academy of Sciences has confirmed these findings, but also has indicated that there are uncertainties regarding how climate change may affect different regions (IPCC 2007). Computer model predictions indicate that increases in temperature will not be equally

distributed, but are likely to be accentuated at higher latitudes. Warming during the winter months is expected to be greater than during the summer, and increases in daily minimum temperatures are more likely than increases in daily maximum temperatures. Increases in temperatures would increase water vapor in the atmosphere and reduce soil moisture, increasing generalized drought conditions, while at the same time enhancing heavy storm events. Although large-scale spatial shifts in precipitation distribution may occur, these changes are more uncertain and difficult to predict.

As with any field of scientific study, there are uncertainties associated with the science of climate change. This does not imply that scientists do not have confidence in many aspects of climate change science. Some aspects of the science are known with virtual certainty, because they are based on well-known physical laws and documented trends (EPA 2008).

Several activities contribute to the phenomena of climate change, including emissions of GHGs (especially CO₂ and methane) from fossil fuel development, large wildfires, and activities using combustion engines; changes to the natural carbon cycle; and changes to radiative forces and reflectivity (albedo). It is important to note that GHGs will have a sustained climatic impact over different temporal scales. For example, recent emissions of CO₂ can influence climate for 100 years.

It may be difficult to discern whether global climate change is already affecting resources, let alone the Planning Area. In most cases there is more information about potential or projected, rather than actual, effects of global climate change on resources.

Rainfall patterns are also affected by global climate change. Total annual precipitation and statewide rainfall patterns are anticipated to change little over the next century; however, it is also possible that the intensity and frequency of extreme storm events could increase (State of California 2006). Continued global warming would cause a decrease in snowmelt and spring stream flows, which are the primary source of California's water supply. Demand for water resources due to an increasing economy and population are likely to continue to increase, potentially overstressing water supply. Agricultural areas would likely be the hardest hit, potentially losing up to 25 percent of needed water supply (State of California 2006). Statewide average temperatures are anticipated to increase between 3°F and 10.5°F by 2100. There is a potential for a greater number of days with temperatures in the 90°F to 100°F range, if temperatures rise to the modeled higher warming ranges. Higher temperatures increase the risks of dehydration, heat stroke/exhaustion, heart attack, stroke, and respiratory distress caused by extreme heat.

Existing and anticipated effects of climate change resources and resource uses in the Planning Area are incorporated into the relevant sections. The following resources have been or are anticipated to be affected by climate change: water, vegetation, and wildlife.

3.3.2 Air Quality

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 driven by the federal CAA of 1970 and its 1977 and 1990 Amendments. Pursuant to the CAA, the EPA has established primary and secondary NAAQS for six pollutants (carbon monoxide [CO], nitrogen dioxide [NO₂], PM₁₀, particulate matter less than 2.5 microns (PM_{2.5}), ozone, sulfur dioxide [SO₂], and lead). 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 exceed a federal air quality standard are designated as non-attainment 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, SO₂, lead, and some particulates are emitted directly into the atmosphere from emission sources. Secondary pollutants, such as ozone, NO₂, 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 ozone) are the pollutants for which emissions are evaluated to control the level of ozone in the ambient air.

Primary standards are adopted to protect public health, and secondary standards are adopted to protect public welfare. States are required to adopt ambient air quality standards which are at least as stringent as the federal NAAQS; however, the state standards may be more stringent. California has adopted standards more stringent than federal standards for some pollutants (Table 3-1). Areas within California in which ambient air concentrations of a pollutant are higher than the state, federal, or both standards are considered to be non-attainment areas for that pollutant.

The ICAPCD and California Air Resources Board (CARB) currently maintain five air quality monitoring stations. These stations are located in: El Centro, Brawley, Calexico Ethel, Westmorland, and Niland. The ICAPCD regularly inspects monitoring stations (ICAPCD 2008).

Air pollutants of primary concern in the Imperial Valley are ozone, PM₁₀, and PM_{2.5}. Not all pollutants are monitored at all monitoring stations. Table 3-2 shows the number of days above the national standards at the monitoring stations for the period 2006 through 2010. The 2009 Imperial County PM₁₀ SIP notes that the particulate exceedances for the period 2006 through 2008 were due either to high wind events or cross-border pollutant transport from Mexico (ENVIRON 2009).

**TABLE 3-1
AMBIENT AIR QUALITY STANDARDS**

Pollutant	Averaging Time	California Standards ^a		Federal Standards ^b		
		Concentration ^c	Method ^d	Primary ^{c,e}	Secondary ^{c,f}	Method ^g
Ozone	1 Hour	0.09 ppm (180 µg/m ³)	Ultraviolet Photometry	–	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.07 ppm (137 µg/m ³)		0.075 ppm (147 µg/m ³)		
Respirable Particulate Matter (PM ₁₀)	24 Hour	50 µg/m ³	Gravimetric or Beta Attenuation	150 µg/m ³	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m ³		–		
Fine Particulate Matter (PM _{2.5})	24 Hour	No Separate State Standard		35 µg/m ³	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m ³	Gravimetric or Beta Attenuation	15 µg/m ³		
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10 mg/m ³)	Non-dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m ³)	None	Non-dispersive Infrared Photometry (NDIR)
	1 Hour	20 ppm (23 mg/m ³)		35 ppm (40 mg/m ³)		
Nitrogen Dioxide (NO ₂)	Annual Arithmetic Mean	0.030 ppm	Gas Phase Chemiluminescence	0.053 ppm (100 µg/m ³)	Same as Primary Standard	Gas Phase Chemiluminescence
	1 Hour	0.18 ppm		–		
Lead ^h	30 days average	1.5 µg/m ³	Atomic Absorption	–	–	–
	Calendar Quarter	–		1.5 µg/m ³	Same as Primary Standard	High Volume Sampler and Atomic Absorption
	Rolling 3-month Average ⁱ	–		0.15 µg/m ³		
Sulfur Dioxide (SO ₂)	Annual Arithmetic Mean	–	Ultraviolet Fluorescence	0.030 ppm (80 µg/m ³)	–	Pararosaniline
	24 Hour	0.04 ppm (105 µg/m ³)		0.14 ppm (365 µg/m ³)	–	
	3 Hour	–		–	0.5 ppm (1300 µg/m ³)	
	1 Hour	0.25 ppm (665 µg/m ³)		–	–	

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AMBIENT AIR QUALITY STANDARDS**

Pollutant	Averaging Time	California Standards ^a		Federal Standards ^b		
		Concentration ^c	Method ^d	Primary ^{c,e}	Secondary ^{c,f}	Method ^g
Visibility Reducing Particles	8 Hour	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 relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		No Federal Standards		
Sulfates	24 Hour	25 µg/m ³	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m ³)	Ultraviolet Fluorescence			
Vinyl Chloride ^h	24 Hour	0.01 ppm (26 µg/m ³)	Gas Chromatography			

Source: CARB 2008

ppm = parts per million; µg/m³ = micrograms per cubic meter.

^a California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, suspended particulate matter—PM₁₀, PM_{2.5}, and visibility reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

^b National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight-hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM₁₀, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m³ is equal to or less than one. For PM_{2.5}, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact EPA for further clarification and current federal policies.

^c 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 torr. Most measurements of air quality are to be corrected to a reference temperature of 25° C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

^d Any equivalent procedure which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.

^e National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.

^f National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

^g Reference method as described by the EPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the EPA.

^h The ARB has identified lead and vinyl chloride as “toxic air contaminants” with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

ⁱ National lead standard, rolling 3-month average: final rule signed October 15, 2008.

**TABLE 3-2
NUMBER OF DAYS ABOVE NATIONAL STANDARDS IN IMPERIAL VALLEY, CALIFORNIA**

Monitoring Station	2006	2007	2008	2009	2010
Ozone (2008 8-hour standard)					
Brawley–220 Main Street	0	0	0	*	*
Calexico–East	5	8	7	1	2
Calexico–Ethel Street	2	9	7	4	2
Calexico–Grant Street†	0	2	*	*	*
El Centro–9 th Street	26	8	2	11	10
Niland–English Road	3	7	3	5	0
Westmorland–West 1 st Street	21	17	6	7	2
PM ₁₀ (24-hour standard)					
Brawley–220 Main Street	0	13.0	0	18.8	0
Calexico–Ethel Street	6.6	6.1	0	18.3	0
Calexico–Grant Street	16.3	*	*	*	*
El Centro–9 th Street	0	7	0	13.1	0
Niland–English Road	0	3.5	0	6.1	0
Westmorland–West 1 st Street	7.1	14	0	6.1	0
PM _{2.5} (24-hour standard)					
Brawley–220 Main Street	*	*	0	*	*
Calexico–East	*	*	*	*	*
Calexico–Ethel Street	17.1	9.2	*	*	6.8
El Centro–9 th Street	0	0	*	3.1	0

* There were insufficient (or no) data available to determine the value.

† Decommissioned after July 2007.

Source: State of California 2011 (iADAM Air Quality Data Statistics. Obtained from the CARB Web site at <http://www.arb.ca.gov/adam/> on September 2, 2011).

Criteria air pollutants are also measured at two monitoring stations in Yuma, Arizona, to the east of the Planning Area. A portion of Yuma County, Arizona, is a maintenance area for PM₁₀. Data from the monitoring sites were only available through 2008. Table 3-3 shows the number of days above the national standards at the stations for ozone, PM₁₀, and PM_{2.5} for the period 2004 through 2008.

**TABLE 3-3
NUMBER OF DAYS ABOVE THE NATIONAL STANDARDS IN YUMA, ARIZONA**

Monitoring Station	2004	2005	2006	2007	2008
Ozone (2008 8-hour standard)					
Yuma–28 th Street	0	7	1	3	6
Yuma–Arizona Avenue	*	*	*	*	6
PM ₁₀ (24-hour standard)					
Yuma–28 th Street	0	0	5.1	13	4.6
Yuma–Arizona Avenue	*	*	5.6	6.4	*
PM _{2.5} (24-hour standard)					
Yuma–28 th Street	*	*	*	*	0

* Data were not available or the station was not in operation.

Source: U.S. EPA 2011 (Air Data: Access to Air Pollution Data. Obtained from the EPA Web site at <http://www.epa.gov/air/data/index.html> on September 2, 2011).

3.3.2.1 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 become nauseated or dizzy, may develop a headache or cough, and may experience eye irritation or a burning sensation in the chest. Ozone is a powerful irritant that attacks the respiratory system, leading to the damage of lung tissue. Inhaled particulate matter, NO₂, and SO₂ can directly irritate the respiratory tract, constrict airways, and interfere with the mucous lining of the airways. When it is absorbed into the bloodstream, CO 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 when levels are high because strenuous activity may cause shortness of breath and chest pains (CARB 2005).

3.3.2.1.1 Sensitive Receptors

Some people are more sensitive than others to air pollutants. Heightened sensitivity may be caused by health problems, proximity to the emissions source, and duration of exposure to air pollutants. Sensitive receptors are facilities that house or attract children, the elderly, and people with illnesses, or others who are especially sensitive to the effects of air pollution. Hospitals, schools, convalescent facilities, and residential areas are examples of sensitive receptors. Residential areas are considered sensitive to poor air quality, as people in residential areas are often at home for extended periods.

3.3.2.2 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 CAA, various state laws and regulations, state air toxics acts (e.g., the AB 1807, AB 2588, and SB 1731 programs), and ICAPCD 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 ICAPCD 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 ICAPCD are the monitoring of air pollution, the preparation of the SIP for Imperial County, and the promulgation of air quality rules. The SIP includes strategies and tactics to be used to attain the federal air quality standard in Imperial County. The Rules and Regulations include procedures and requirements to control the emission of pollutants and to prevent adverse impacts (ICAPCD 2007).

3.3.2.3 Federal Clean Air Act Conformity

The CAA Amendments of 1977 (42 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.

In the 1990 CAA Amendments, EPA included provisions requiring federal agencies to ensure that actions undertaken in non-attainment or attainment-maintenance areas are consistent with applicable SIPs. The ICAPCD has adopted Rule 925, general conformity, in compliance with the original EPA Conformity Regulations.

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 non-attainment 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). 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 non-attainment of the CAAQS only.

3.3.2.4 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 (or plan) of the state 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. 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., NO₂) and non-attainment for others (ozone and PM₁₀).

Areas that were designated as nonattainment 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 non-attainment designation, depending on the severity of non-attainment. For example, the ozone-non-attainment 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.

Ambient criteria air pollutant concentrations in Imperial County are measured at five air quality monitoring stations operated by ICAPCD and CARB. All of the air quality monitoring stations are located between 13 and 25 miles west of the Planning Area.

3.3.2.5 Sources of Regional and Local Pollution

Although Imperial County experiences temperature inversions almost daily, these inversions are usually broken, allowing pollutants to more easily disperse. The atmosphere is stable enough to allow PM₁₀ pollution to accumulate and frequently reach elevated concentrations across the southern border of Imperial County. Under stagnant and light wind conditions, elevated dust concentrations in Mexicali, Mexico, can cause PM₁₀ to drift across the border into the U.S. town of Calexico (Imperial County 2008b). Metropolitan Mexicali comprises approximately one million people and has PM₁₀ emissions estimated at 257 tons/day, compared with emissions of about 13 tons/day for the considerably smaller town of Calexico (population approximately 32,000).

High concentrations of PM₁₀ 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. 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 (Imperial County 2008b).

The EPA has listed a portion of Imperial County as nonattainment for PM_{2.5} (particulate matter that is 2.5 microns or less in diameter) for the 2006 standard. The EPA classified Imperial Valley as a serious PM₁₀ nonattainment area in 2004. In addition, the EPA proposed a rule to find that the Imperial Valley area had failed to attain the annual and 24-hour PM₁₀ standards by the serious area deadline of December 31, 2001. The EPA

finalized the rule in December of 2007 citing as the basis for the rule that five Imperial County monitoring stations recorded violations of the 24-hour standard during 1999–2001. The EPA’s final rule action required the State of California to submit an air quality plan that demonstrated that Imperial County would attain the PM₁₀ standard as expeditiously as practicable. Since the Imperial Valley area was designated as nonattainment for PM₁₀, the Imperial County government agencies and industry groups, private and public stakeholders, along with the ICAPCD have worked to reduce PM₁₀ emissions and bring the area into compliance with the NAAQS. These efforts culminated in the 2005 amendments of the ICAPCD Regulation VIII Best Available Control Methods, adopted in advance of the 2009 Imperial County SIP for the purposes of accelerating Best Available Control Method implementation and to meet requirements as well as the schedule of Imperial County’s Natural Event Action Plan (ENVIRON 2009). The primary contributors of air pollutants (PM₁₀) within lands administered by the BLM in Imperial County are: OHV recreation; mining operations; geothermal and other alternative energy operations; various short-term construction projects such as installation of utility lines; and naturally caused by wind (BLM 2006a). Analysis of renewable energy projects was not conducted under this plan as only one application has been submitted (solar energy) adjacent to the Planning Area, and analysis would be speculative at this time. Analysis presented in Chapter 4 of this EIS focuses on the OHV recreational activities that would occur under the proposed alternatives. The BLM has developed a *Fugitive Dust Control Plan* to identify sources of PM₁₀ within lands administered by BLM and identify dust control measures that can be implemented to help minimize or eliminate emissions (BLM 2006a). A revised plan has been developed by BLM and submitted to Imperial County and EPA for review.

Emissions sources associated with the existing use of the Planning Area consist of combustion emissions from OHVs; small internal-combustion generator engines; recreational vehicles and on-road motor vehicles (commuting to, traveling within, and departing from the site); and fugitive dust emissions from vehicles traveling over paved and unpaved surfaces. The principal sources of criteria pollutant emissions are automobiles, recreational vehicles, and wind.

3.4 Soil Resources

The ISD 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 five 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.

In the unique environment of the ISD, wind erosion and deposition have created the dune formations. The soils within the dunes shift naturally as a result of local wind patterns, creating the dynamic, constantly moving dunes system. Within the Planning Area and particularly within the washes and creosote scrub community, natural erosion occurs as a result of large storm events throughout the year.

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 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 dune 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, which are 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).

3.4.1 Sand and Soils

A soils report was written for Imperial County by the USDA NRCS (1981). The report's survey area is in the south-central portion of Imperial County and bounded by the U.S.–Mexico border on the south, Algodones Sand Hills (western portion of the Planning Area) on the east, Salton Sea on the north, San Diego County on the northwest, and alluvial fans bordering the Coyote Mountains and Yuha Desert on the southwest.

The NRCS is currently working on the Colorado Desert Area soil report, which will include the Planning Area. Mapping for this effort is not complete. Based on the 1981 Imperial County soil survey report and information obtained from the NRCS Web Soil Survey tool (NRCS 2008), the western portion of the Planning Area is composed of 10 different soil series. The following are brief descriptions of the soil series within the Planning Area as described in the Imperial County soils report (NRCS 1981).

Antho Series (coarse-loamy, mixed) consists of very deep, well-drained soils that formed in alluvial deposits in basins of the lower Colorado River area. The natural vegetation is creosote bush, white bursage, ephedra, and ephemeral herbs and grasses. Antho soils are similar to Holtville, Indio, Meloland, Niland, Superstition, and Vint soils (NRCS 1981). This soil series is known to be present in scattered, small pocket areas throughout the western portion of the Planning Area, most of which lie south of SR-78 and just east of the Coachella Canal.

Carsitas Series (mixed) consists of very deep, excessively drained soils that formed in alluvial deposits of granitic and metamorphic origin on alluvial fans, beach ridges, and drainageways. The natural vegetation is scattered shrubs of wingscale, creostoebush, bursage, and ocotillo, with mesquite, palo verde, and smoketree in the drainageways. Carsitas soils are similar and near to the Niland, Rositas, Superstition, and Vint soils. They are also near the Holtville, Imperial, Indio, and Meloland soils (NRCS 1981). This soil series is known to be present in sparsely scattered, small areas, mostly south of SR-78 within the western portion of the Planning Area.

Holtville Series (clayey over loamy) consists of very deep, well-drained, stratified soils that formed in mixed alluvial deposits on flood plains, terraces, and basin floors. The natural vegetation is a sparse growth of quailbush, creosote bush, and mesquite. Holtville soils are similar to Imperial and Meloland soils. They are near the Imperial, Indio, Meloland, Niland, Rositas, and Vint soils (NRCS 1981). This soil series is known to be present in densely scattered pockets throughout the western portions of the Planning Area, most of which lie south of SR-78 and just east of the Coachella Canal.

Imperial Series (fine) consists of very deep, moderately well-drained soils that formed in recent alluvial deposits on flood plains and basins. The natural vegetation is a sparse growth of quailbush, creosote bush, inkweed, and pickleweed. Imperial soils are similar and near to the Holtville, Meloland, and Vint soils (NRCS 1981). This soil series is known to be present, in conjunction with the Holtville series, in densely scattered pockets throughout the western portions of the Planning Area, most of which lie south of SR-78 and just east of the Coachella Canal.

Indio Series (coarse-silty, mixed) consists of very deep, well-drained soils that formed in recent mixed alluvial or eolian material on flood plains and basins. The natural vegetation is scattered creosote bush, bursage, and wingscale. Indio soils are similar to the Antho, Meloland, and Vint soils. They are near the Holtville, Imperial, Meloland, Niland, Rositas, and Vint soils (NRCS 1981). This soil series is known to be present in conjunction with the Vint series, scattered sparsely along the western side of the Coachella canal within the Planning Area.

Meloland Series (coarse-loamy over clayey, mixed) consists of very deep, well drained, stratified soils that formed in mixed alluvium on flood plains and alluvial basin floors. The natural vegetation is a sparse shrub growth of creosote bush, bursage,

wingscale, and mesquite. Meloland soils are similar to Antho, Holtville, Indio, and Niland soils. They are near the Holtville, Imperial, Indio, Niland, Rositas, and Vint soils (NRCS 1981). This soil series is known to be present along the Coachella Canal within the western portion of the Planning Area.

Niland Series (sandy over clayey, mixed) consists of very deep, moderately well-drained, stratified soils that formed in mixed alluvium on the edges of flood plains and alluvial basins. The natural vegetation is a sparse shrub growth of creosote bush, bursage, wingscale, and mesquite. Niland soils are similar to and near Carsitas, Imperial, Meloland, Rositas, and Vint soils (NRCS 1981). This soil series is known to be present in scattered, small pocket areas within the western portion of the Planning Area.

Rositas Series (mixed sands) consists of very deep, somewhat excessively drained soils that formed in alluvial or eolian sands on flood plains, basins, terraces, and sandhills. The natural vegetation is shrub growth of creosote bush, bursage, wingscale, desert buckwheat, ephedra, and mesquite. Rositas soils are similar to and near the Antho, Carsitas, Meloland, Niland, Superstition, and Vint soils. They are also near the Holtville, Imperial, and Indio soils (NRCS 1981). The Rositas sands are the predominant soil series throughout the western portion of the Planning Area.

Superstition Series (sandy, mixed) consists of very deep, somewhat excessively drained soils that formed in sandy alluvial or eolian deposits from mixed sources on old terraces and alluvial fans. The natural vegetation is scattered creosote bush; ephemerals of the *Plantago*, *Cyptantha*, and *Oenothera* genera; and some white bursage and ephedra. Superstition soils are similar to and near the Carsitas, Rositas, and Vint soils. They are also near the Antho and Holtville soils (NRCS 1981). This soil series is known to be present in scattered, small pocket areas throughout the western portion of the Planning Area.

Vint Series (sandy, mixed) consists of very deep, well-drained soils that formed in mixed alluvial or eolian materials on flood plains and alluvial basins. The natural vegetation is a sparse shrub cover of wingscale, mesquite, creosote bush, and bursage. Vint soils are similar to and near the Antho, Indio, Rositas, and Superstition soils. Vint soils are also near the Holtville, Imperial, Meloland, and Niland soils (NRCS 1981). This soil series is known to be present in conjunction with the Indio series, scattered sparsely along the western side of the Coachella Canal within the Planning Area.

The western portion of the Planning Area is composed primarily of Rositas sands with lesser areas of Antho loamy fine sands and Holtville silty-clay loams. The Rositas sands range from loamy fine sands to fine sands and to medium sands. The larger-grained Rositas sands are mostly in the western, upwind section of the Planning 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 four 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.

3.5 Water Resources

The Planning Area is located in the desert of southeastern California, an area marked by long, hot summers and meager rainfall. Surface water in the extended vicinity of the Planning Area 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 Planning Area are limited.

3.5.1 Surface Water

There are no major lakes or reservoirs on BLM-administered lands within the Planning Area. There are two primary surface waterways in the vicinity of the Planning Area, the All-American Canal and the New Coachella Canal. There are also several surface water wildlife guzzlers (water retaining structures) within the Planning Area.

3.5.1.1 All-American Canal

The All-American Canal is approximately 80 miles long and part of the All-American Canal System, located in the southeastern corner of California, which consists of the Imperial Diversion Dam and Desilting Works, All-American Canal, Coachella Canal, and appurtenant structures (U.S. Department of the Interior, Bureau of Reclamation [BOR] 2008). The All-American Canal serves the Imperial and Coachella valleys in southern California and the Yuma Project in California and Arizona. The All-American Canal System was authorized under the Boulder Canyon Project Act of 1928, and construction began in 1934, following the construction of Hoover Dam. The canal system crosses the Colorado Desert and is entirely within the United States. The first irrigation water was delivered in 1940. The BOR owns the canal, but it is operated by the Imperial Irrigation District (BOR 2008). Because portions of the original canal were unlined, a substantial amount of water was lost through seepage. The Bureau of Reclamation, Imperial Irrigation District, the State Department of Water Resources, and the San Diego County Water Authority began the All-American Canal Lining Project in 2007 to prevent this seepage. Construction of the concrete-lined canal was completed in 2010.

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. Approximately 3.1 million acre-feet of Colorado River water is delivered annually through the All-American Canal to nine cities and over 500,000 acres of agricultural lands throughout the Imperial Valley (Imperial Irrigation District 2006).

3.5.1.2 Coachella Canal

The New Coachella Canal is connected to the All-American Canal at what is known as Drop 1 in the southern Planning Area near I-8. The Coachella Canal originally was completed in 1948 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 Planning Area. The first 49 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 (BOR 2008).

The 49-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 northwest along the approximate western boundary of the ISD SRMA.

3.5.1.3 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 six wildlife guzzlers, five within the North Algodones Dunes Wilderness and one wildlife guzzler in the Mammoth Wash area to the north of the wilderness (within Administrative Closure).

Pursuant to California Fish and Game Commission Waterfowl Hunting Regulations (§730), camping/occupying is prohibited within 200 yards of any wildlife guzzler within the boundary of the CDCA, which includes BLM-managed lands within the Planning Area (2011).

3.5.1.4 Ephemeral Surface Flows

Numerous washes that carry storm runoff exist within the Planning Area. 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 Planning Area. 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.

3.5.2 Groundwater

The Planning Area falls within the Colorado River Hydrologic Region. The primary groundwater basin located in the Planning Area is the Imperial Valley Basin. The Imperial Valley Basin is approximately 1,870 square miles in Imperial County. This basin is bounded to the east by the ISD, to the west by the impermeable rocks of the Fish Creek and Coyote Mountains, to the north by the Salton Sea, and to the south by the Mexico border (although the basin likely extends many miles south into Mexico). The principal source of recharge for the Imperial Valley Basin is from irrigation return. Other recharge sources include percolation of rainfall and surface runoff, underflow into the basin, and seepage from unlined canals which traverse the valley.

Analyses of the Imperial Valley Basin indicate that the groundwater quality is unusable without treatment due to elevated levels of total dissolved solids (TDS); fluoride and boron levels are also elevated (DWR 2004). The total storage capacity of the Imperial Valley Basin is 14,000,000 acre-feet with the amount of stored water unknown (DWR 2004).

The Amos–Ogilby–East Mesa Basin is adjacent to the Planning Area. This groundwater basin is a northwesterly trending, elongated area of approximately 860 miles within the southeastern portion of Imperial County. This basin likely extends hundreds of miles into northern Mexico. The principal historic source of recharge to the water-bearing deposits within the Amos–Ogilby–East Mesa Basin has been reported to be from the Colorado River and, more recently, leakage from the previously unlined All-American Canal and the Coachella Canal.

Several observation wells associated with the All-American Canal were installed within the Planning Area by the BOR in the early 1980s. These wells were installed in close proximity to the canal because canal water seepage into the groundwater was of concern (BOR 1994). The wells are no longer read on a regular basis, and the canal is being lined to prevent seepage (see 3.5.1.1 above).

The state agencies that implement groundwater-related monitoring programs are the SWRCB and Regional Water Quality Control Boards (RWQCBs), DWR, Department of Health Services, Department of Toxic Substances Control, and Department of Pesticide Regulation. These agencies are represented on the Interagency Task Force. Federal agencies that implement groundwater-related monitoring programs include the EPA, BOR, and the U.S. Geological Survey (USGS). The DWR requires that water from newly constructed wells be sampled, and the water quality assessed. The Imperial County Public Health Department, Section of Environmental Health and Consumer Protection Services regulate the design, construction, maintenance, and destruction of water wells throughout Imperial County to protect the county's groundwater resources.

The laws and regulations applicable to the public supply wells establish numerical water quality criteria for contaminants, called Maximum Contaminant Levels, to protect public health.

3.5.3 Watershed Basins and Hydrologic Units

The Planning Area is located within the Colorado River (Region 7) watershed basin. The Colorado River Basin includes all of Imperial County and portions of San Bernardino, Riverside, and San Diego counties. Within these watersheds are the smaller Imperial and Amos–Ogilby hydrologic units.

3.5.4 Water Use

Water use on BLM-administered lands in the Planning Area consists primarily of wildlife use (guzzlers). The Buttercup Ranger Station has potable water, while the Cahuilla Ranger Station has only non-potable water (well sources). None of the BLM-administered campgrounds in the Planning Area have potable water sources.

3.5.5 Regulatory Setting

3.5.5.1 Clean Water Act

The CWA extensively amended the Federal Water Pollution Act of 1948. The objective of the Federal Water Pollution Control Act, commonly called the CWA (PL 92-500, as amended; 33 USC §§1251 et seq.) is to restore and maintain the chemical, physical, and biological integrity of the nation's waters (Section 101a). Under Sections 401 and 404, the CWA regulates point- and non-point-source pollution and, along with EO 11990 titled *Protection of Wetlands, Impacts to Wetlands*.

The CWA has three major approaches to water pollution control:

1. Construction grants for reducing municipal discharges;
2. National Pollutant Discharge Elimination System (NPDES) permits for control of point source (storm water and waste water) discharges
3. Water quality management planning for non-point-source control from diffuse natural origins such as sediment

In 1972, Congress adopted a “zero-discharge” goal and a focus on “preventable causes of pollution” to emphasize the source of contamination rather than controls at the outfall or water body itself. Water quality standards include a legal designation of the desired use for a given body of water and the water quality criteria appropriate for that use. The criteria are specific levels of water quality which are expected to make a water body suitable for its desired use. “Effluent limitations” are restrictions on quantities, rates, and concentrations in wastewater discharges measured at the discharger’s outfall pipe.

Administration of Section 401 of the act is delegated to the SWRCB in California and, locally, to the Colorado River RWQCB. The RWQCB is responsible for setting water quality standards and criteria for water bodies in the regional plan, and for issuing and enforcing NPDES permits. A NPDES permit is currently not required for BLM activities in the ISD SRMA. The 401 Water Quality Certification application is available on the internet (<http://www.swrcb.ca.gov>).

Section 13241 of the California Water Code provides that each RWQCB shall establish water quality objectives for the waters of the state (i.e., ground and surface waters) which, in the RWQCB’s judgment, are necessary for the reasonable protection of beneficial uses and prevention of nuisance. Section 303 of the CWA requires the state to adopt water quality objectives for surface waters. The Colorado River RWQCB has established surface and groundwater quality objectives and water quality standards for contaminants (DWR 2005).

The DWR is the primary state agency mandated to address water quantity (water supply) information (DWR 2005).

3.5.6 Federal Reserved Water Rights for Designated Wilderness Areas

Federal water rights, which mostly supersede state water laws, can be asserted on federally managed lands. The federal government is required, however, to submit all reserved water rights claims to the state’s adjudication process, limited by the ‘primary purpose’ and ‘minimal needs’ requirements. In addition, federal reserved water rights are

nontransferable. Once a land transfer occurs, the federal water rights are no longer valid (BLM 2006b).

Reserved water rights in an area designated as wilderness are “set aside pursuant to the Wilderness Act of 1964 (16 USC Section 1131). The Wilderness Act reserves the amount of water within the Wilderness Area necessary to preserve and protect the specific values responsible for designation of the area and to provide for public enjoyment of these values” (BLM 2006b).

In addition, federal reserved water rights for wilderness were explicitly established by statute at Section 706 of the CDDA (PL103-433).

3.5.6.1 Beneficial Use Designations

The Planning Area is located in the Colorado River Basin within the jurisdiction of the RWQCB 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 Amos-Ogilby hydrologic unit.

3.6 Vegetation Resources

3.6.1 Vegetation Communities

The primary vegetation communities within the Planning Area are: creosote bush scrub, microphyll woodland, psammophytic scrub, and canal-influenced vegetation (Westec 1977; BLM 1987). Vegetation communities are depicted in Map 3-1 and described in detail below.

3.6.1.1 Creosote Bush Scrub

Creosote bush scrub is the most common vegetation community in the Colorado Desert and typically occurs on well-drained secondary soils of slopes, fans, and valleys. Within the Planning Area, this vegetation community occurs on the relatively stable soils along the periphery of the dune system. It rarely occurs in the central portion of the Planning Area, where shifting dunes are prevalent. This vegetation community is generally characterized by relatively barren ground between widely spaced shrubs. To the west of the Planning Area, the community consists of almost pure stands of creosote bush. On the eastern boundary of the Planning Area, 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 vegetation community. The creosote scrub vegetation community covers approximately 80,981 acres of the entire Planning Area. Characteristic plant species of this community include creosote bush (*Larrea tridentata*), brittlebush (*Encelia farinosa*), and burrobush (*Ambrosia dumosa*). Less abundant species associated with this community 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*).

3.6.1.2 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 vegetation community typically is best developed in the larger drainages where dense stands of a variety of trees occur. Microphyll woodlands are generally found along the margins of these dry channels and around the cul-de-sac sinks of their termini. This vegetation community covers approximately 21,992 acres of the entire Planning Area. Vegetation is generally sparse in the open wash areas between the sinks. Typical vegetation of this community includes palo verde, ironwood, smoke tree, and to a lesser degree honey mesquite, desert willow, and desert unicorn plant (*Proboscidea altheaefolia*). Depending on rainfall, the understory in the plains is generally composed of shrubs and annuals such as desert starvine (*Brandegea bigelovii*), carrizo mallow (*Sphaeralcea orcuttii*), California threeawn, Mediterranean grass (*Schismus barbatus*), lineleaf white puff (*Oligomeris linifolia*), and rush milkweed (*Asclepias subulata*).

3.6.1.3 Psammophytic Scrub

Psammophytic scrub occurs within the interior dune system where active and partially stabilized dunes are found. This vegetation community 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 vegetation community covers approximately 106,247 acres of the entire Planning Area. Common vegetation within this community includes Mormon tea, Colorado desert buckwheat, desert dicoria (*Dicoria canescens*), common sandpaper plant (*Petalonyx thurberi*), desert panicum (*Panicum urvilleanum*), and plicate coldenia (*Tiquilia plicata*). Additionally, birdcage evening primrose (*Oenothera deltoides*) and desert lily (*Hesperocallis undulata*) may occur in the relatively stable dunes that form a transitional zone with the creosote bush scrub vegetation community.

3.6.1.4 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 (*Myriophyllum 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*).

3.6.2 Priority Plant Species

Priority plant species are rare, unusual, or key species that are not BLM sensitive or listed as threatened and endangered. They are worthy of special treatment and indicate ecological health, biological diversity, and unique habitats. A number of priority plant species are either known or suspected to occur on BLM-administered lands within the Planning Area based on direct observations or presence of the species within the vicinity of BLM-administered lands.

Priority plant species that are known from or near the BLM-administered lands within the Planning Area are listed in Table 3-4.

**TABLE 3-4
PRIORITY PLANT SPECIES**

Common Name	Scientific Name	Habitat(s) Found
Blue palo verde	<i>Cercidium floridum</i> spp. <i>floridum</i>	Microphyll woodland
Catclaw acacia	<i>Acacia greggii</i>	Microphyll woodland
Ironwood	<i>Olneya tesota</i>	Microphyll woodland
Mesquite	<i>Prosopis glandulosa</i>	Microphyll woodland
Sand food	<i>Pholisma sonora</i>	Psammophytic scrub
Smoketree	<i>Psoralea argophylla</i>	Microphyll woodland

3.6.2.1 California Native Plant Society Species

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 plant 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.

A number of CNPS species are either known or suspected to occur on BLM-administered lands within the Planning Area based on direct observations or presence of the species within the vicinity of BLM-administered lands (Table 3-5).

**TABLE 3-5
CNPS SPECIES**

Common Name	Scientific Name	CNPS Status
Borrego milk-vetch	<i>Astragalus lentiginosus</i> var. <i>borreganus</i>	CNPS-4.3
California ditaxis	<i>Ditaxis serrata</i> var. <i>californica</i>	CNPS-3.2
Coulter's lyrepod	<i>Lyrocarpa coulteri</i> var. <i>palmeri</i>	CNPS-4.3
Crown-of-thorns	<i>Koeberlinia spinosa</i> spp. <i>tenuispina</i>	CNPS-2.2
Desert unicorn plant	<i>Proboscidea altheaefolia</i>	CNPS-4.3
Fairy duster	<i>Calliandra eriophylla</i>	CNPS-2.3
Foxtail cactus	<i>Coryphantha alversonii</i>	CNPS-4.3
Giant Spanish needle	<i>Palafoxia arida</i> var. <i>gigantea</i>	CNPS-1B.3
Glandular ditaxis	<i>Ditaxis clariana</i>	CNPS-2.2
Hairy stickleaf	<i>Mentzelia hirsutissima</i>	CNPS-2.3
Harwood milk-vetch	<i>Astragalus insularis</i> var. <i>harwoodii</i>	CNPS-2.2
Munz's cholla	<i>Opuntia munzii</i>	CNPS-1B.3
Orocopia sage	<i>Salvia greatae</i>	CNPS-1B.3
Ribbed cryptantha	<i>Cryptantha costata</i>	CNPS-4.3
Rock nettle	<i>Eucnida rupestris</i>	CNPS-2.2
Sand food	<i>Pholisma sonorae</i>	CNPS-1B.2
Thurber's pilostyles	<i>Pilostyles thurberi</i>	CNPS-4.3
Wiggins' croton	<i>Croton wigginsii</i>	CNPS-2.2
Winged cryptantha	<i>Cryptantha holoptera</i>	CNPS-4.3

Note: The CNPS Threat Rank is an extension added to rare plant ranking to designate the level of endangerment by a 0.1 to 0.3) ranking, with 0.1 being most endangered and 0.3 being the least endangered. Threat ranks are as follows: 0.1 = seriously threatened in California (high degree/immediacy of threat); 0.2 = fairly threatened in California (moderate degree/immediacy of threat); and 0.3 = not very threatened in California (low degree/immediacy of threats or no current threats known).

Source: CNPS 2009.

3.6.2.2 California Natural Diversity Database

The CNDDDB is a program provided by the CDFG that inventories the status and locations of rare plants and animals in California. The goal of the CNDDDB is to provide the most current information available on the state's imperiled plants and wildlife and to provide tools to analyze these data (CNDDDB 2009a). The BLM uses the CNDDDB to gather spatial data (population and individual occurrences) about plant and wildlife species that occur on BLM-administered lands.

3.6.3 Invasive and Noxious Weed Species

Throughout southern California, native vegetation has been altered by the introduction—and in many cases dominance—of non-native plant species, some of which can change ecosystem dynamics dramatically. These invasive and noxious weed species compete with native plant species for water, nutrients, or sun; disrupt processes such as soil nitrogen cycling or pollination relationships; or predispose an area to wildfire by creating excess fuel loads. Several non-native species have the ability to completely change the structure of the vegetation community, making it unsuitable to most native wildlife species. Special status wildlife and plant species are particularly at risk from these invasive weed species.

Some non-native plants that occur in very low numbers or seem innocuous for years may expand their range dramatically and become a difficult pest weed under the right environmental conditions. These conditions might be brought about by a year with very late rains or a flood that results in heavy sedimentation of drainages leading to the establishment of riparian weeds.

Signed in February 1999, EO 13112 directs federal agencies to identify and manage invasive species. The order stipulates that actions will be taken to prevent the introduction of invasive species, monitor for their presence, and respond rapidly to eliminate them.

An effective way to implement these actions is through the Federal Noxious Weed Act of 1975, which requires federal land managers to develop a management program to control undesirable plants on federal lands under the agency's jurisdiction and to cooperate with state and federal agencies to manage undesirable plants.

The BLM maintains a federal list of noxious weeds of concern. In addition, the State of California and California Invasive Plant Council (Cal-IPC) also maintain lists that focus particularly on California. Based on these lists, the BLM determined the invasive and/or noxious weeds that occur or are likely to occur in the Planning Area (Table 3-6).

**TABLE 3-6
INVASIVE AND/OR NOXIOUS WEEDS KNOWN OR WITH
THE POTENTIAL TO OCCUR IN THE PLANNING AREA**

Common Name	Scientific Name
Saharan mustard	<i>Brassica tournefortii</i>
Ripgut brome	<i>Bromus diandrus</i>
Red brome	<i>Bromus madritensis</i> spp.
Redstem filaree	<i>Erodium cicutarium</i>
Russian thistle	<i>Salsola tragus</i>
Mediterranean steppegrass	<i>Stipa capensis</i>
Tamarisk	<i>Tamarix</i> spp.

3.7 Wildlife

3.7.1 General Wildlife

The Planning Area provides habitat for an abundance of wildlife species, including numerous birds, mammals, reptiles and invertebrates. The ISD SRMA is one of the largest dune ecosystems in the United States and there are many species that are endemic to this unique area. As mentioned in Section 3.6, Vegetative Resources, several vegetation communities are found within the Planning Area, providing habitat features for a variety of wildlife species.

Wildlife commonly associated with the creosote bush scrub vegetation community includes 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*). The endemic Hardy's dune beetle (*Anomala hardyorum*) and Carlson's dune beetle (*Anomala carlsoni*) are also found in this vegetation community (Hardy and Andrews 1979).

The plant diversity and density combined with the micro-topographic variability associated with the washes in the Planning Area accounts for a high diversity of wildlife in the microphyll woodlands. The wildlife commonly associated with this vegetation community includes 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 (*Canis latrans*), kit fox, mule deer (*Odocoileus hemionus*), white-tailed antelope squirrel (*Ammospermophilus leucurus*), black-tailed hare, and desert cottontail (*Sylvilagus audubonii*).

The wildlife commonly associated with psammophytic scrub include black-tailed gnatcatcher, mourning dove, cliff swallow (*Hirundo pyrrhonota*), coyote, roundtail ground squirrel, desert kangaroo rat (*Dipodomys deserti*), and black-tailed hare. The endemic Andrew's dune scarab beetle (*Psuedocotalapa andrewsi*) is also found in this habitat type (Hardy and Andrews 1979).

The canal-influenced vegetation community is used 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 community include black-tailed hare, coyote, raccoon (*Procyon lotor*), and American badger (*Taxidea taxus*).

Table 3-7 lists additional wildlife species that are known or have the potential to occur within the Planning Area.

3.7.2 Wildlife Habitat Improvements

The CDFG installed six wildlife guzzlers, five within the North Algodones Dunes Wilderness and one in the Mammoth Wash area to the north of the wilderness (within the Administrative Closure), to serve as wildlife waters. The wildlife guzzlers were installed by the CDFG to partially mitigate impacts from the construction of the New Coachella Canal. These guzzlers have created limited herbaceous weedy vegetation within the microphyll woodlands. The presence of water and forage around the guzzlers has attracted mule deer (*Odocoileus hemionus*) from the Chocolate Mountain range. Mule deer are known to use the microphyll woodland vegetation community associated with washes as corridors through the North Algodones Dunes Wilderness and into the southern part of the Mammoth Wash area. It is thought that the Yuma puma (*Felis concolor browni*) has preyed upon mule deer within the microphyll woodlands in the Planning Area.

**TABLE 3-7
ADDITIONAL WILDLIFE SPECIES OF INTEREST THAT OCCUR
OR POTENTIALLY OCCUR IN THE PLANNING AREA***

Common Name	Scientific Name
Mammals	
Colorado River cotton rat	<i>Sigmodon arizonae plenus</i>
Desert pallid bat	<i>Antrozous pallidus pallidus</i>
Desert woodrat	<i>Neotoma lepida</i>
Greater western mastiff bat	<i>Eumops perotis californicus</i>
Merriam's kangaroo rat	<i>Dipodomys merriami</i>
Occult little brown bat	<i>Myotis lucifugus occultism</i>
White-throated woodrat	<i>Neotoma albigula venusta</i>
Wild burro	<i>Equus asinus</i>
Yuma hispid cotton rat	<i>Sigmodon hispidus eremicus</i>
Yuma myotis	<i>Myotis yumanensis</i>
Yuma mountain lion	<i>Felis concolor browni</i>
Birds	
Ash-throated flycatcher	<i>Myiarchus cinerascens</i>
American kestrel	<i>Falco sparverius</i>
Barn owl	<i>Tyto alba</i>
Black tern	<i>Chlidonias niger</i>
Black-throated sparrow	<i>Amphispiza bilineata</i>
Crissal thrasher	<i>Toxostoma dorsale</i>
Gilded northern flicker	<i>Colaptes auratus chrysoides</i>
Golden eagle	<i>Aquila chrysaetos</i>
Great horned owl	<i>Bubo virginianus</i>
LeConte's thrasher	<i>Toxostoma lecontei</i>
Loggerhead shrike	<i>Lanius ludovicianus</i>
Long-eared owl	<i>Asio otus</i>
Merlin	<i>Falco columbarius</i>
Mountain plover	<i>Charadrius montanus</i>
Northern harrier	<i>Circus cyaneus</i>
Prairie falcon	<i>Falco mexicanus</i>
Say's phoebe	<i>Sayornis saya</i>
Sharp-shinned hawk	<i>Accipiter striatus</i>
Turkey vulture	<i>Cathartes aura</i>
Vaux's swift	<i>Chaetura vauxi</i>
Western screech owl	<i>Otus kennicottii</i>
Insects	
Algodones bee	<i>Perdita algodones</i>
Algodones croton jewel beetle	<i>Agrilus harenus</i>
Algodones sand jewel beetle	<i>Lepismadora algodones</i>
Algodones wasp	<i>Euparagia</i> spp.
Algodones white wax jewel beetle	<i>Prasinalia imperialis</i>
Andrews' dune scarab beetle	<i>Pseudocotalpa andrewsi</i>
Brow-tassel weevil	<i>Trigonoscuta brunnotasselata</i>

**TABLE 3-7
ADDITIONAL WILDLIFE SPECIES OF INTEREST THAT OCCUR
OR POTENTIALLY OCCUR IN THE PLANNING AREA***

Common Name	Scientific Name
Insects (cont.)	
Carlson's dune scarab beetle	<i>Anomala carlsoni</i>
Cheeseweed owlfly	<i>Oliarves clara</i>
Elegant sand wasp	<i>Microbembix elegans</i>
Glamis bee	<i>Perdita glamis</i>
Hardy's dune scarab beetle	<i>Anomala hardyorum</i>
Imperial velvet ant	<i>Dasymutilla imperialis</i>
Nocturnal velvet ant	<i>Dasymutilla nocturna</i>
Roth's dune weevil	<i>Trigonoscuta rothi</i>
Wanda's dune scarab beetle	<i>Cyclocephala wandae</i>
Amphibians	
Arizona southwestern toad	<i>Bufo microscaphus microscaphus</i>
Couch spadefoot toad	<i>Scaphiopus couchii</i>
Reptiles	
Chuckwalla	<i>Sauromalus obesus</i>
Rosy boa	<i>Lichanura trivirgata</i>

*The species found within the Planning Area include, but are not limited to, those listed in this table.

3.7.3 Priority Wildlife Species Habitat

BLM designates priority species and habitats, in addition to special status species, for fish or wildlife species recognized as significant for at least one factor such as density, diversity, size, public interest, remnant character, or age (see Land Use Planning Handbook H-1601-1, Appendix C). The priority wildlife identified by the BLM for management in the ISD includes raptors, non-game migratory birds, bats, and game animals. Each of these species has high public interest. The following provides a brief description of the basic needs of each of these wildlife categories.

Non-game migratory birds. Migratory birds are dependent on habitat that is shrinking throughout the world. Migratory birds are protected under the Migratory Bird Treaty Act (as amended), and federal agencies are required to promote the conservation of migratory birds under the Act and Executive Order 13186. Non-game migratory birds include neotropical migrants (the majority are songbirds, but also include shorebirds, raptors, and waterfowl), which are an important component of the ecosystem. They have a wide variety of habitat needs for food, water, cover, and nesting and are a good environmental indicator of overall ecosystem health.

Raptors. Many raptor species and populations have declined over their ranges. Raptors as a group are migratory birds, which are identified in 50 CFR 10.13. As such, federal and state protection is provided for raptors and, if federally listed, under the

ESA. Raptors require a variety of foraging and nesting/roosting habitat. Most raptor species in the Planning Area require large open areas in which to hunt for small mammals. Most raptors nest in tall trees or rock cliffs.

Bats. In general, bat populations are in decline throughout California, with 10 of 24 bat species classified as “Species of Special Concern” by CDFG. Bats have specialized roosting and breeding habitat requirements, often establishing colonies in caves/mines, rock outcrops, bridges, tree cavities, abandoned buildings, or other enclosed protected places. These species are nocturnal and will exit the roosting location in the evenings to forage for food within the vicinity of the colony.

Game animals. Game animals have high public interest and are an important recreation resource on public lands. BLM is required to manage for the habitat of all game animals that occur on their administered lands within the Planning Area. Habitat features include ensuring there is sufficient food/forage, water, and cover/nesting locations. Mule deer and quail occur in the semi-desert vegetation communities.

3.7.4 Insects

An intensive survey of the insects of the Planning Area was done between September 2007 and September 2008 by the University of California, Bohart Museum of Entomology (Appendix I). Based on the initial data analysis of roughly 50,000 specimens collected during the 2007–2008 survey, a second year of inventory was initiated and was completed in 2009. Based on the two interim reports (see Appendix I and Kimsey 2009), the conclusions in the following sub-sections were provided. In addition, a study of the diversity of velvet ants (Hymenoptera: Mutillidae; Pitts et al. 2009) found within the Planning Area was conducted and conclusions are provided in sub-sections below.

3.7.4.1 Insect Diversity

Of the 75,000 specimens collected thus far, 1,121 species have been identified so far and it is anticipated that once identification is complete, there will be nearly 1,500 insect species recorded for the Planning Area. There are insect groups that occur within the Planning Area, but that did not appear in samples, primarily due to the highly specialized collecting techniques and missing annual periods of activity by days or weeks. Groups that occur within the Planning Area that did not appear in the samples, but are likely to occur there based on other historic museum collections, include some jewel beetles (*Buprestidae*) and certain darkling beetles (*Tenebrionidae*), nocturnally active bees, some dragonflies, and walking sticks (see Appendix I).

3.7.4.2 Correlations with Plant Diversity

The insect survey results indicated that there was an association between plant diversity and insect diversity. The greatest number of insects and the highest diversity of plants and insects were found within the microphyll woodlands on the eastern side of the dunes. Few endemic insect species were found, the plants and insects commonly occur across other regions of Imperial and Riverside counties, as well as western Arizona. The microphyll woodlands have a relatively large number of flowering plant species and a higher diversity of bees and insect parasitoids associated with bees and wasps. The microphyll woodlands also provide a diversity of woody plants, trees, and shrubs that provide resources for insects and their parasites that forage on wood and foliage. Exposed sand, gravel, and silt of the washes within the microphyll woodlands provide nesting sites for ground-nesting wasps, predatory beetles, ants, and grasshoppers (see Appendix I).

3.7.4.3 Endemic Species

A total of 64 insect species are known to be endemic to the Planning Area, including 34 newly described by these surveys. The majority of endemic insect species are found within the psammophytic scrub vegetation community, the sparse, scattered perennial plants and short-lived annuals of the dunes, or the open dunes (the barren ground interspersed within the psammophytic scrub vegetation community). These plants within the dunes serve as host plants and sources of nectar, and pollen for the endemic insect species. Surveys also found a large number of endemic insect species on woody perennial plants along Gecko Road, which is a high use recreation area during the winter. These plant species occur in very low numbers or do not occur at all in habitats adjacent to the Planning Area (see Appendix I; Kimsey 2009).

3.7.4.4 Seasonal Abundance

Insect species numbers and diversity were highest during the months of March through October during daytime temperatures of 29° to 49° Celsius. Within this period, insect numbers and diversity experienced temporary increases several weeks after monsoon rainfalls between July and September. Endemic insect species were dominant during summer months and exotic species were dominant between November and March. Exotic species, such as the bean and pea aphid (*Aphidiidae*) and a variety of pest noctuid moths, including cutworms and army worms (*Noctuidae*), arrive from adjacent agricultural lands (see Appendix I).

3.7.4.5 Endemic Plants

Endemic plants such as *Astragalus magdalenae* var. *peirsonii*, *Helianthus niveus* spp. *tephrodes*, and *Croton wigginsii*, were surveyed to determine insects visiting the plants.

For *Astragalus magdalenae* var. *peirsonii*, only one pollinator, a large bee (likely *Habropoda pallida*), was observed visiting plants. Nesting aggregations for this bee species were found along north facing dune slopes within the North Algodones Dunes Wilderness, approximately one mile east of the New Coachella Canal road. Two exotic species, the bean and pea aphids, were also observed on *Astragalus* in March, but only winged adults were found, which suggests that this species cannot reproduce on this plant (see Appendix I).

For *Helianthus niveus* spp. *tephrodes*, a species of Melissodes was observed pollinating. *Croton wigginsii* appears to be an important source of nectar for a variety of endemic insect species within the dunes (see Appendix I).

3.7.4.6 Human Impacts

The majority of endemic insect species, such as root feeders, foliage feeders, and pollinators, were associated with perennial plants within the western and central dunes. Few seedlings of these perennial plants were observed within areas of high recreational use (areas with recreational vehicle access). High recreational use could cause sand compaction and disruption of insects that spend a portion of their life cycle in the sand. However, the endemic plant *Tiquilia* and the insects that are associated with this plant were found to be most abundant within disturbed areas along the New Coachella Canal and near the Cahuilla Ranger Station off Gecko Road, both high recreational use areas. The majority of the endemic insect species are active during the hot summer months (see Appendix I; Kimsey 2009), when visitorship tends to be lowest. The findings of the report suggest that protecting vegetation would act as a surrogate for protecting endemic insect species.

3.7.4.7 Insect Species of Concern

The CDFG lists special animals as those taxa the CNDDDB is interested in tracking, monitoring distribution, and determining potential threats. This list represents those species with conservation needs but does not convey any legal protection. Several insect species found within the Planning Area are listed as special animals and may be at risk, these include: Algodones sand jewel beetle; Andrew's dune scarab beetle; Carlson's dune scarab beetle; and Hardy's dune scarab beetle. Brief information about these species is found below. Information on other endemic insect species not listed by the CDFG may be found in the insect survey report (see Appendix I).

3.7.4.7.1 Algodones Sand Jewel Beetle (*Lepismadora algodones*)

The Algodones sand jewel beetle has been observed visiting the flowers of coldenia (*Tiquila plicata*). This plant is widespread within the western portion of the Planning Area, but this beetle species is typically found near these plants growing adjacent to the

Old Coachella Canal, west of the dunes. Mating most likely occurs on the adult host plant, coldenia. After mating, the female flies to a larval host plant to lay an egg on dead or dying tissue, where it hatches and bores into the plant roots. The life cycle is probably annual based on the small size of the adult beetle. Specimens have been observed in June and July with most observations from mid-June to early July where they are active from approximately during about mid-day (Velten and Bellamy 1987). No information about threats to this species is available.

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

Likely endemic to the Planning Area, 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 vegetation communities. Little is known about the biology of this beetle. Current information about the distribution and preferred habitat within the Planning Area is not available (CNDDDB 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 use the subsurface wet sand to regulate body temperature during the day (CNDDDB 2001). No information about threats to this species is available.

3.7.4.7.3 Carlson's Dune Scarab Beetle (*Anomala carlsoni*)

The Carlson's dune beetle is likely endemic to the ISD system; however, there is limited information available about the microhabitat requirements or basic biology of this species (CNDDDB 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 (CNDDDB 2001). No information about threats to this species is available.

3.7.4.7.4 Hardy's Dune Scarab Beetle (*Anomala hardyorum*)

Hardy's dune beetle is likely endemic to the ISD SRMA and is found primarily in the eastern portion of the Planning Area. 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 (CNDDDB 2001). No information about threats to this species is available.

3.7.4.8 Velvet Ants of the Planning Area

The diversity of velvet ants found within the ISD was investigated and 40 species were found to inhabit areas on and around the dunes (Pitts et al. 2009). Of these species, four were found to be restricted to the dunes and another four were found to not be restricted to the dunes, but can be found in much greater abundance within the dunes than elsewhere. One new species of velvet ant was detected and recorded within the Planning Area (Pitts et al. 2009).

3.7.4.9 Sufficiency of Insect Surveys

There is still much to learn regarding invertebrates of the dunes. NEPA requires action agencies to use relevant data in the formulation of alternatives and in their assessment of foreseeable significant adverse impacts; however, information may be incomplete or unavailable. Information is considered incomplete or unavailable, when the overall cost of obtaining the information is exorbitant (40 CFR 1502.22). The BLM recognizes that the insect sampling done thus far is incomplete. To attain a nearly complete inventory of the insect species of the dunes, it appears that a third season of sampling would be needed, but this sampling would need to occur during a “wet” year (Kimsey 2009). Additionally, to gather information on some families of insects, more specific collection methods would be needed, at an additional cost. While the species list is not complete, data collected thus far clearly indicate a strong relationship between dune insects and native vegetation associations. Given that the information on insects is unavailable, BLM would use vegetation as a surrogate for insects in its analysis of the potential impacts the alternatives may have on insects. The BLM’s primary tool for the reduction or mitigation of impacts to insects would be the conservation (e.g., in the form of the existing wilderness, ACECs, critical habitat) of large tracts of each habitat type that the insects rely upon.

3.8 Special Status Species

Special status species, as defined in BLM Manual 6840 (Special Status Species Management), include: 1) species listed or proposed for listing under the ESA; and 2) species requiring special management consideration to promote their conservation and reduce the likelihood and need for future listing under the ESA, which are designated as BLM sensitive species by the State Directors. BLM sensitive species include all federal candidate species, proposed species, and delisted species in the five years following delisting. For purposes of this discussion, “federally listed species” is a more narrowly defined term, referring to those species listed as endangered, threatened, or proposed under the ESA of 1973, as amended, including designated or proposed critical habitat, if applicable; as well as candidates for federal listing. Per Section 7(a) of the ESA, “All other Federal agencies shall, in consultation with and with the assistance of the

Secretary, utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species and threatened species listed pursuant to section 4 of this Act.”

The sensitive species designation is normally used for species that occur on BLM-administered lands for which BLM has the capacity to significantly affect the conservation of the species through management.

The basic policy of BLM is to:

1. Conserve and/or recover ESA-listed species and the ecosystems on which they depend so that ESA protections are no longer needed for these species
2. Initiate proactive conservation measures that reduce or eliminate threats to BLM sensitive species to minimize the likelihood of and need for listing of these species under the ESA. Uncommon plants not offered special status as described below are not currently protected.

The BLM has certain responsibilities for all special status species and as such does not reiterate listings provided by other agencies. The BLM sensitive species list is meant to be dynamic. If information shows that a species needs to be included or removed, Field Managers may make nominations with information supporting such action. Species designated as BLM sensitive must be native species found on BLM-administered lands for which the BLM has the capacity to significantly affect the conservation status through management, and either:

1. There is information that a species has recently undergone, is undergoing, or is predicted to undergo a downward trend such that the viability of the species or a distinct population segment of the species is at risk across all or a significant portion of the species range, or
2. The species depends on ecological refugia or specialized or unique habitats on BLM-administered lands, and there is evidence that such areas are threatened with alteration such that the continued viability of the species in that area would be at risk (BLM 2008d).

There are a number of BLM special status plant and wildlife species that are known from the Planning Area. BLM Manual 6840 (BLM 2008d) states that BLM should coordinate BLM special status species conservation efforts with adjoining BLM State Offices, state and other federal agencies, various private organizations, and BLM stakeholders. Based on this guidance, this section also discusses State of California, CDFG, and CNPS listed species. Species listed by the ESA, BLM, State of California, CDFG, and CNPS are presented in Table 3-8 and discussed in the sections below. This table also provides an assessment regarding occurrence on BLM-administered lands within the Planning Area. Reports of special status species can be found in Appendix J.

**TABLE 3-8
SPECIAL STATUS SPECIES**

Common Name	Scientific Name	Federal Status	State Status	BLM Status	CNPS Status	Occurrence Known or Suspected
Plant Species						
Peirson's milk-vetch	<i>Astragalus magdalenae</i> var. <i>peirsonii</i>	FT	CDFG SSC	SSP		Known
Wiggin's croton	<i>Croton wigginsii</i>		SR			Known
Algodones Dunes sunflower	<i>Helianthus niveus</i> spp. <i>tephrodes</i>		SE			Known
Munz's cholla	<i>Opuntia munzii</i>				1B	Known
Giant Spanish needle	<i>Palafoxia arida</i> var. <i>gigantea</i>				1B	Known
Sand food	<i>Pholisma sonora</i>				1B.2	Known
Orocopia sage	<i>Salvia greatei</i>				1B.3	Suspected
Wildlife Species						
Mammals						
Spotted bat	<i>Euderma maculatum</i>		CDFG SSC			Suspected
California leaf-nosed bat	<i>Macrotus californicus</i>		CDFG SSC			Suspected
Cave myotis	<i>Myotis velifer</i>		CDFG SSC			Suspected
Townsend's big-eared bat	<i>Plecotus townsendii</i>		CDFG SSC			Known
Birds						
Burrowing owl	<i>Athene cunicularia</i>		CDFG SSC			Known
Gila woodpecker	<i>Melanerpes uropygialis</i>		SE			Known
LeConte's thrasher	<i>Toxostoma lecontei</i>		CDFG SSC			Known
Arizona Bell's vireo	<i>Vireo bellii arizonae</i>		SE			Known
Amphibians						
Lowland leopard frog	<i>Rana yavapaiensis</i>		CDFG SSC			Suspected
Couch's spadefoot toad	<i>Scaphiopus couchi</i>		CDFG SSC			Known
Reptiles						
Desert tortoise (Mojave population)	<i>Gopherus agassizii</i>	FT	ST	SSP		Known
Flat-tailed horned lizard	<i>Phrynosoma mcallii</i>		CDFG SSC			Known
Colorado Desert fringe-toed lizard	<i>Uma notata</i>		CDFG SSC			Known

FT = federally listed threatened

SE = state-listed endangered

SR = state-listed rare

ST = state-listed threatened

CNPS = California Native Plant Society

CDFG = California Department of Fish and Game

SSC = species of special concern

SSP = Special Status Species

3.8.1 Federally Listed Species

The USFWS has identified two federally listed species as occurring within the Planning Area: PMV and the Mojave population of the desert tortoise (USFWS 2009). Accounts are presented below for the two listed species identified in this section as possibly occurring in the Planning Area. Pertinent aspects of the status, distribution, life history, and habitat requirements of these species have been extracted from a variety of sources, including the proposed and final rules to list these species; the proposed and final rules to designate critical habitat, recovery plans, scientific journal articles, and other relevant documents. Records of occurrence for the Planning Area are based on BLM file documents and field notes; published literature sources, and technical reports.

3.8.1.1 Peirson's Milk-vetch (*Astragalus magdalenae* var. *peirsonii*)

3.8.1.1.1 Status

PMV was proposed as endangered by the USFWS in 1992 and listed as threatened in 1998 (USFWS 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 PMV as a category 1B (rare, threatened, or endangered in California and elsewhere throughout its range (Tibor 2001). Critical habitat for this species was designated by USFWS on February 14, 2008 (USFWS 2008a).

3.8.1.1.2 Life History

A short-lived perennial plant of the pea family (Fabaceae), PMV may reach 8 to 30 inches in height and develop tap roots that penetrate deeply to the moister sand and anchor the plants in the shifting sand dunes (USFWS 2008a). 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).

Based on the current understanding of the PMV life history, sufficient rain in conjunction with cool temperatures and wetter-than-average fall weather appear to trigger germinating events (USFWS 2008a). This species likely depends on the production of seeds in wetter years and the persistence of the seed bank from previous years to survive until appropriate conditions for germination occur again (USFWS 2008a).

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 PMV 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. PMV 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, which contributes to a high mortality of seeds and reduced seed crop for this species (Romspert and Burk 1979).

PMV 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).

3.8.1.1.3 Distribution and Occurrence within the Planning Area

An obligate psammophyte, PMV occurs on bowls, swales, and slopes of intact, active, windblown sand dunes. This species is currently known to occur within the dunes of the Planning Area as well as the northeastern Estado de Baja California and Gran Desierto of northwestern Sonora, Mexico (USFWS 2008a). Although it has been reported from Borrego Valley, San Diego County, California, it has not been observed there for several decades (Tibor 2001).

Within the Planning Area, this species is restricted to about 53,000 acres in a narrow band running 40 miles northwest to southeast along the western portion of the ISD. Plants are generally scattered throughout the dune complex with a higher abundance along the central and western aspect of the dunes. The sand dunes within the Planning Area are estimated to support between 75 and 80 percent of all of the world's known colonies of this species (USFWS 1998).

Ongoing monitoring has indicated that the distribution and abundance of PMV is closely tied to precipitation. Plants are most abundant in years with the highest rainfall and least abundant in years with the lowest rainfall. Response of PMV was similar in areas both open and closed to OHV use (Willoughby 2001).

Surveys conducted for PMV between 2002 and 2006 (Phillips and Kennedy 2002, 2003, 2004, 2005, and 2006) concluded that the population of PMV within the ISD was considered vibrant, healthy, and responsive to climatic events that promoted germination more than any other factor, natural or human-caused. PMV plants were able to remain dormant by means of a healthy seed bank when conditions were unfavorable and to germinate explosively when rainfall conditions and temperature were favorable. The surveys indicated that this species was well-adapted to survive and thrive in extreme conditions of rainfall, drought, heat, cold, and abrading winds which move large amounts of substrate in a short time. The adaptability of PMV plants and their distribution in the ISD with respect to patterns of OHV use indicated that natural factors under which it has evolved were much more important than human-caused factors, including recreation, in determining its health, vigor, and status in the ISD (Phillips and Kennedy 2002, 2003, 2004, 2005, and 2006).

Although on-the-ground field surveys for the Phillips and Kennedy reports were conducted among different subgroups (northern and southern portions of the ISD) within the open OHV areas, observational helicopter surveys were conducted for PMV within the Administrative Closure areas (49,000 acres). No data are presented in these studies regarding the survival of the seed bank for the species in the Administrative Closure areas. Surveys were also conducted related to the 2000 lawsuit and negotiated settlement, whereby the BLM closed portions of the Planning Area with PMV habitat to OHV use while it developed an updated RAMP. The BLM agreed that those areas would not be reopened until the ROD for the RAMP was signed. A survey conducted in 2001 (Thomas Olsen Associates [TOA] 2001) totaled approximately 35,000 acres; however, the 2002–2006 surveys totaled 138 acres. While the 2002–2006 survey data may provide additional useful information about the PMV, it is difficult to extrapolate the data from the limited survey area to the PMV critical habitat (12,105 acres) within the ISD Planning Area as a whole.

3.8.1.1.4 Critical Habitat

Surveys for the PMV have been conducted repeatedly since about 1977. The BLM conducted annual surveys for this species from 1997 to 2000 and from 2004 to 2007. Based on data collected during these surveys and other relevant information, the USFWS designated critical habitat for the PMV on August 4, 2004, comprising a total of 21,863 acres (USFWS 2004). Critical habitat was revised and re-designated on February 14, 2008 (USFWS 2008a) and now includes 12,105 acres in three units. All areas designated as critical habitat are currently occupied, within the species geographical range, and contain sufficient primary constituent elements to support at least one life history function. The USFWS determined that the primary constituent elements for the PMV are:

- West and/or northwest-facing sides of bowls, swales, and slopes consisting of Rositas fine sands within intact, active sand dune systems (defined as sand areas that are subject to sand-moving winds) in the existing range of the species that provide space needed for individual and population growth, including sites for germination, reproduction, seed dispersal, seed bank, and pollination
- The associated co-adapted psammophytic scrub plant community characterized by *Croton wigginsii*, *Eriogonum deserticola*, *Helianthus niveus* spp. *tephrodes*, *Palafoxia arida* var. *gigantea*, *Pholisma sonora*, *Tiquilia plicata*, *Petalonyx thurberi*, and *Panicum urvilleanum* that provides habitat for insect pollinators, particularly the white-faced digger bee (*Habropoda pallida*), required for reproduction
- Areas within intact, active sand dune systems between occupied bowls, swales, and slopes that allow for pollinator movement and wind dispersal of fruit and seeds

Map 3-2 depicts designated PMV critical habitat within the Planning Area.

3.8.1.1.5 Threats

The OHV recreation and associated recreational development have been described as the primary threats to PMV through destruction of individual plants and habitat (USFWS 2008a). The OHV recreation can impact PMV habitat by:

1. Disrupting the natural processes that support dune formation, movement, and structure, which could disrupt the available habitat needed for individual and population growth;
2. Causing the collapse of dune faces and ridges, which could result in burial of the seed bank;
3. Disturbing surface sand, thereby decreasing soil moisture needed for establishment of individual plants and population growth, and
4. Degrading the psammophytic scrub plant community that provides habitat for pollinators required for reproduction.

3.8.1.2 Mojave Population of Desert Tortoise (*Gopherus agassizii*)

3.8.1.2.1 Status

The Mojave population of desert tortoise was emergency listed by the USFWS as an endangered species in 1989 and federally listed as threatened in 1990 (USFWS 1990). It is also recognized as threatened by the State of California and as a special status species by the BLM. The BLM has completed several management plans including the West Mojave Management Plan (WEMO; BLM 2006c), Northern and Eastern Mojave Desert Management Plan (NEMO; BLM 2002a), and NECO (BLM 2002b). The WEMO and NEMO plan amendments are not applicable to the ISD SRMA. An important focus of these plans was the management of the Mojave population of desert tortoise and its habitat on BLM-administered lands in California. A final recovery plan was completed by the USFWS in 1994 and a draft revised recovery plan was released in 2008 (USFWS 1994a and 2008b). Critical habitat for the Mojave population was also designated by the USFWS in 1994 (USFWS 1994b). The Chuckwalla Bench Critical Habitat Unit for this species is located approximately 20 miles northeast of the Planning Area.

3.8.1.2.2 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 until about November. During the winter months, tortoises are 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. They retreat into short individual burrows or under shrubs during the extreme heat of the summer (Woodbury and Hardy 1940). During the active period, desert tortoises may establish home ranges of approximately one square mile. Tortoises feed on a wide variety of herbaceous plants, including cacti, grasses, and annual flowering plants (USFWS 1994a).

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 three to four inches deep that is dug near the mouth of a burrow. Following egg laying the female covers the eggs with soil (Woodbury and Hardy 1940). Clutch size ranges from two to 14 eggs with an average of five to six 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 hatchling for up to six months. The hatchling desert tortoise will go into hibernation in the late fall, but can be active on warm sunny or rainy days (Luckenbach 1982).

3.8.1.2.3 Distribution and Occurrence within the Planning 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 1994a). 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 (USFWS 1994a).

Desert tortoise habitat in the general vicinity of the Planning Area has been degraded and fragmented by OHV and camping recreation, agricultural development, utility corridors, and the construction and maintenance of the UPRR and All-American Canal. Along the eastern portion of the Planning Area, the creosote bush scrub habitat and the desert washes north and south of SR-78 provide marginal suitable habitat for the desert tortoise. BLM and USBP officials have observed desert tortoises in the general vicinity of and crossing Vista Mine and Ted Kipf roads. To date, limited surveys for desert tortoise have been conducted within the Planning Area. Limited desert tortoise distribution and abundance data currently exist. Map 3-3 shows the tortoise habitat within and adjacent to the Planning Area.

3.8.1.2.4 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 (including predation by ravens), highway mortality, vandalism, agriculture, fire, drought, and OHV recreation all have contributed to the decline of the tortoise in the wild (Luckenbach 1982; USFWS 1990). Another important reason for the decline of the desert tortoise is the introduction of an upper respiratory tract disease 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 1994a).

Raven monitoring was conducted for the Mesquite Regional Landfill as part of compliance with the USFWS BO terms and conditions for the Mojave desert tortoise found within the study area. Monitoring for ravens was to be conducted two years prior to landfill operation and at least one of those years prior to disturbance from construction. The Mesquite Regional Landfill monitoring study began in 1994 and data was collected for 2 years; however, these studies preceded landfill construction by more than 10 years. Monitoring baseline studies were re-initiated in 2005 and 2006. Monitoring included 21 sites surrounding the landfill, with seven monitoring sites located within or immediately adjacent to the ISD Planning Area (monitoring sites 3, 4, 5, 6, 7, 8, and 9). Results of monitoring indicated that raven observations were low in the study area in all years compared to regional increases. These data, along with a variation in observations, indicated that raven populations may not be well established in the immediate vicinity of the Mesquite Regional Landfill. Overall, ravens were more often observed in the fall than in the spring, this may be due to spring brooding occurring outside the study area and the increased presence of juveniles in the fall. No nests were found within the study area during monitoring surveys. Based on data gathered in 1994 and 1995, it was hypothesized that most ravens in the immediate study area are transients, not residents. This trend will likely change as the Mesquite Regional Landfill becomes operational and landfill waste will provide a dependable year-round food source, increasing the likelihood that ravens will become more common residents in the area. Campgrounds within the ISD Planning Area included in the Mesquite Regional Landfill monitoring surveys showed pre-existing elevated raven occurrences in 2007–2008, which are likely to continue (EDAW/AECOM 2009).

3.8.2 State-listed Species

3.8.2.1 Algodones Dunes Sunflower (*Helianthus niveus* spp. *Tephrodes*)

3.8.2.1.1 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).

3.8.2.1.2 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; once established, it is able to survive periods of below-average precipitation. Felger (2000) reported that the species is 1.5 to over 3 feet tall. Like PMV, Algodones Dunes sunflower has relatively large seeds and is fast growing.

3.8.2.1.3 Distribution and Occurrence within the Planning 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).

3.8.2.1.4 Threats

Within the Planning Area, the primary threat to Algodones Dunes sunflower is destruction of individual plants and habitat by OHV recreation and associated recreational development.

3.8.2.2 Wiggins' Croton (*Croton wigginsii*)

3.8.2.2.1 Status

Wiggins' croton was recognized by the State of California as rare in January 1982 (CNDDDB 2009b). It is also recognized by the CNPS as Category 2 (rare, threatened, or endangered in California, but common elsewhere in their range).

3.8.2.2.2 Life History

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

3.8.2.2.3 Distribution and Occurrence within the Plan Area

This species is native to California, Arizona, and Baja California and Sonora, Mexico. Within the Planning Area, it is found within psammophytic scrub habitat and prefers stabilized and partially stabilized desert dune systems (CNDDDB 2009b). It most often grows on south or southeast slopes of basins, and sometimes grows farther toward the floor of the basin (TOA 2001).

3.8.2.2.4 Threats

Within the Planning Area, the primary threat to Wiggins' croton is destruction of individual plants and habitat by OHV recreation and associated recreational development.

3.8.2.3 Gila Woodpecker (*Melanerpes uropygialis*)

3.8.2.3.1 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.

3.8.2.3.2 Life History

The Gila woodpecker is a “zebra-backed” woodpecker and 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 activity in April and May. They are cavity nesters and may use abandoned owl cavities (CDFG 2001).

3.8.2.3.3 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 to habitat degradation, most of the current populations are concentrated in the California area of Brawley (CDFG 2001). Brawley is located approximately 20 miles west of the Planning Area. Within the Planning Area, this species may occur in the microphyll woodland habitat on the eastern side of the dunes. The BLM has conducted surveys (point counts) for this species within the Planning Area during the last four seasons. However, this survey data have not provided sufficient information to determine distribution and abundance of this species.

3.8.2.3.4 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).

3.8.2.4 Arizona Bell's Vireo (*Vireo bellii arizonae*)

3.8.2.4.1 Status

The Arizona Bell's vireo was listed by the State of California as endangered in 1988.

3.8.2.4.2 Life History

The Arizona Bell's vireo is a small, active bird. They are typically found in lowland riparian areas, with willows, mesquite, and seepwillows. They prefer dense, low, shrubby vegetation in riparian areas. This vireo is an insectivore, feeding on caterpillars, beetles, bees, wasps, and spiders. They build their nests in low dense vegetation usually less than 5 feet above the ground. Nests are often located near openings within thickets and near water (Arizona Game and Fish Department 2002).

In California, the Arizona bell's vireo is a summer resident of willow and mesquite riparian habitat of the Sonoran Desert (the low desert area of southeastern California).

3.8.2.4.3 Distribution and Occurrence within the Plan Area

The lower Colorado River historically provided the vast majority of habitat for this species in California. This species may be found in the microphyll woodlands and along the canal-influenced vegetation within the Planning Area.

3.8.2.4.4 Threats

In California, the Arizona bell's vireo is found primarily within remnants of cottonwood-willow and mesquite riparian habitats. In these areas, there are two primary threats to this species, the loss of habitat through human and human-induced activities, and nest parasitism by brown-headed cowbirds.

3.8.3 California Native Plant Society

3.8.3.1 Munz's Cholla (*Opuntia munzii*)

3.8.3.1.1 Status

Munz's cholla is listed by CNPS as a Category 1B (rare, threatened or endangered species in California).

3.8.3.1.2 Life History

Munz's cholla is a shrub- to tree-like cactus from 2 to 6 feet in height and almost as wide. This species is native to California and is endemic (limited) to the state alone (CalFlora 2009). This cholla is found in dry, gravelly, or sandy places in creosote bush

scrub vegetation communities. They are typically found in elevations from 480 to 1,900 feet. Flowers usually bloom in May (BLM 2009a). This cholla only reproduces vegetatively.

3.8.3.1.3 Distribution and Occurrence within the Planning Area

Munz's cholla is known to occur within Imperial County and portions of Riverside County. This species is most likely to occur within the creosote scrub vegetation community surrounding the dunes system within the Planning Area.

3.8.3.1.4 Threats

Some occurrences of Munz's cholla are threatened by military activities with the species range (CalFlora 2009). Within the Planning Area, the primary threat to Munz's cholla is destruction of individual plants and habitat by OHV recreation and associated recreational development.

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

3.8.3.2.1 Status

The CNPS lists the giant Spanish needle as Category 1B (rare, threatened, or endangered in California and elsewhere throughout their range).

3.8.3.2.2 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 non-dune taxa (Felger 2000). Felger (2000) reports it growing from 2 to 5 feet tall.

3.8.3.2.3 Distribution and Occurrence within the Planning 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 2001b). As a short-lived flowering perennial, it frequently occurs within the Planning Area in sites with PMV and croton (BLM 2001b; TOA 2001). Most occurrences of giant Spanish needle have been found south of I-8 (TOA 2001).

3.8.3.2.4 Threats

Within the Planning Area, the primary threat to giant Spanish needle is destruction of individual plants and habitat by OHV recreation and associated recreational development.

3.8.3.3 Sand Food (*Pholisma sonora*)

3.8.3.3.1 Status

The CNPS lists this species as Category 1B.2 (rare, threatened, or endangered in California and elsewhere throughout their range).

3.8.3.3.2 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*, *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).

3.8.3.3.3 Distribution and Occurrence within the Planning Area

The primary habitat of sand food is open, sandy flats and sandy or stony desert washes within creosote bush scrub (CNDDDB 2001). Sand food was found at scattered locations, most commonly in the Gecko Road area and an area north of I-8. It was generally found in somewhat flat areas, but its appearance was difficult to predict, as there were many sites with hosts but without sand food (TOA 2001).

3.8.3.3.4 Threats

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

3.8.3.4 Orocopia Sage (*Salvia greatae*)

3.8.3.4.1 Status

The CNPS lists this species as Category 1B.3 (rare, threatened, or endangered in California and elsewhere throughout their range).

3.8.3.4.2 Life History

Orocopia sage is a dicot shrub that is native to California (endemic). This species is typically found in Mojave and Sonoran desert scrub communities. The preferred habitat

for this sage is in gravelly or rocky soils on broad bajadas or fans, often adjacent to desert washes, or on rocky benches elevated above the floodplain of a wash (Coachella Valley Multi-species Habitat Conservation Plan 2009). The blooming period for this sage is usually March and April.

Though *Orocopia* sage is patchy in its distribution, where it occurs it is typically one of the dominant members of the vegetation. Plants may be 3 to 4 feet tall and usually form dense, rounded clumps, sometimes as large as 4 or 5 feet in diameter. Multiple branching from near ground level results in a very bushy habitat (Coachella Valley Multi-species Habitat Conservation Plan 2009).

3.8.3.4.3 Distribution and Occurrence within the Planning Area

This sage is endemic to the Orocopia Mountains, Mecca Hills, and Chocolate Mountains. This species likely occurs near the eastern boundary of the Planning Area, west of the Chocolate Mountains (Coachella Valley Multi-species Habitat Conservation Plan 2009).

3.8.3.4.4 Threats

Threats to this species are few in that its habitat is largely protected within the Mecca Hills, Orocopia Mountains, and Chuckwalla Mountains wilderness areas, established by the 1994 Desert Protection Act. There may be some threat from illegal OHV recreation as well.

3.8.4 CDFG Species of Special Concern

3.8.4.1 Spotted Bat

3.8.4.1.1 Status

The spotted bat is recognized by the CDFG as a species of special concern.

3.8.4.1.2 Life History

Spotted bats have three large white spots on their backs that show up clearly against their black bodies. They also have very large ears that are almost 2 inches in length. Spotted bats are among the rarest in North America. As a result, little is known about the life history and habits of spotted bats. Few roosts of this species have been found, but rock crevices are thought to be commonly used. This species likely feeds almost entirely on moths, supplementing their diet with other insects. The reproduction cycle of spotted bats has not been thoroughly studied, but biologists have determined that pregnant females give birth to one young in June (BLM 2009a).

3.8.4.1.3 Distribution and Occurrence within the Planning Area

This species likely occurs in the Cargo Muchacho Mountains east of the Planning Area, it may also occur in the Chocolate Mountains. Although no roosting habitat for the spotted bat exists within the Planning Area, there is foraging habitat within and adjacent to the Planning Area. To date, the BLM has not conducted any surveys for this species within the Planning Area. Therefore, distribution and abundance data do not currently exist.

3.8.4.1.4 Threats

The decline of spotted bats is primarily due to human interference, such as habitat destruction and alteration. Bats live in natural as well as in human-made structures such as caves, bridges, and abandoned mines. Vandalism and destruction of these structures exclude or harm bats using them. Activities such as building bonfires under bridges can also cause bats to die from smoke inhalation. Many bridges and mines also contain maternity dens, where human disturbance causes detrimental impacts on adults as well as young (BLM 2009a).

3.8.4.2 California Leaf-nosed Bat

3.8.4.2.1 Status

The California leaf-nosed bat is recognized by the CDFG as a species of special concern.

3.8.4.2.2 Life History

California leaf-nosed bats are typically found in desert scrub vegetation communities of southern California where it is closely associated with mine shafts and tunnels. This bat is a medium-sized species distinguished by its combination of large ears and vertical "leaf-like" projection on its nose. Leaf-nosed bats forage primarily along microphyll washes for their insect prey, which includes grasshoppers, beetles and moths. Most foraging activity for this species seems to occur within about a 1-mile radius of the roost site, with forays of up to a 5-mile radius during warm months. Adult bats mate in the autumn months. The young are born in May or June. A female bat gives birth to a single offspring (BLM 2009a).

3.8.4.2.3 Distribution and Occurrence within the Planning Area

California leaf-nosed bats have been captured during studies in the Cargo Muchacho Mountains, east of the Planning Area. Although no roosting habitat for the California leaf-nosed bat exists within the Planning Area, there is foraging habitat within and adjacent to the Planning Area. To date, the BLM has not conducted any surveys for this species

within the Planning Area. Therefore, distribution and abundance data do not currently exist.

3.8.4.2.4 Threats

The decline of California leaf-nosed bats is primarily due to human interference, such as habitat destruction and alteration. Bats live in natural as well as in human-made structures such as caves, bridges, tunnels, and abandoned mines. Vandalism and destruction of these structures exclude or harm bats using them. Many bridges and mines also contain maternity dens, where human disturbance causes detrimental impacts on adults as well as young (BLM 2009a).

3.8.4.3 Cave Myotis

3.8.4.3.1 Status

The cave myotis is recognized by the CDFG as a species of special concern.

3.8.4.3.2 Life History

The cave myotis is a large bat identified by a wing membrane that extends to its toes. Roost sites include caves, tunnels, mine shafts, and bridges. Within California, this species is found primarily in the extreme southeastern portion of the state. Cave myotis live in colonies of 2,000 to 5,000 individuals within caves. These bats mate in the fall, but because of delayed implantation the females do not become pregnant until spring. In June or July females give birth to one pup. The young begin to forage on their own at about one month old and are weaned shortly after that (BLM 2009a).

3.8.4.3.3 Distribution and Occurrence within the Planning Area

California distribution and occurrence records for this species include mountain ranges in southeastern California. Although no roosting habitat for the cave myotis exists within the Planning Area, there is foraging habitat within and adjacent to the Planning Area. To date, the BLM has not conducted any surveys for this species within the Planning Area. Therefore, distribution and abundance data do not currently exist.

3.8.4.3.4 Threats

The decline of cave myotis bats is primarily due to human interference, such as habitat destruction and alteration. Bats live in natural as well as in human-made structures such as caves, bridges, tunnels, and abandoned mines. Vandalism and destruction of these structures exclude or harm bats using them (BLM 2009a).

3.8.4.4 Townsend's Big-eared Bat

3.8.4.4.1 Status

The Townsend's big-eared bat is recognized by the CDFG as a species of special concern.

3.8.4.4.2 Life History

The Townsend's big-eared bat is a medium-sized bat with extremely large ears joined across the forehead. Known roosting sites in California include caves, mine tunnels, and abandoned buildings. They hibernate during the winter months, frequently waking up to move locations, and feed almost entirely on moths. The rest of their diet consists of beetles and a variety of fly species. This species feeds relatively late at night, emerging from its roost site about 45 minutes after sunset (BLM 2009a).

During the summer months females and young can be found in maternity colonies, usually constructed in caves and buildings. In California, there may be up to 200 individuals in a single colony. The females arrive at the colony site in March and April and they remain there until September. Females give birth to one young during the month of June. The pups are able to fly at three weeks of age and they are weaned by the time they are five weeks old (BLM 2009a).

3.8.4.4.3 Distribution and Occurrence within the Planning Area

Townsend's big-eared bats are known to forage within desert scrub vegetation communities adjacent to the Planning Area. No roosting habitat for the Townsend's big eared bat likely exists within the Planning Area. To date, the BLM has not conducted any surveys for this species within the Planning Area. Therefore, distribution and abundance data do not currently exist.

3.8.4.4.4 Threats

The Townsend's big-eared bat is extremely intolerant of disturbance, even a single human visit into a roosting site may cause these bats to abandon the site (BLM 2009a). The decline of this bat species is primarily due to human interference, such as habitat destruction and alteration.

3.8.4.5 Western Burrowing Owl (*Athene cunicularia*)

3.8.4.5.1 Status

The western burrowing owl is recognized by CDFG as a species of special concern.

3.8.4.5.2 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 non-migratory 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 (BLM 2009a).

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.

3.8.4.5.3 Distribution and Occurrence within the Planning Area

Throughout the Imperial Valley, burrowing owls are frequently found along unlined agricultural canals and drainages. This species 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 within the Planning Area, although there have been anecdotal sightings of burrowing owl in the microphyll woodlands (E. Dreyfuss, pers. comm.). The psammophytic habitat is not suitable for this species. However, the creosote bush scrub and microphyll woodland habitats within the eastern portion of the Planning Area are suitable for burrowing owls. The BLM has conducted surveys (point counts) for this species within the Planning Area during the last four seasons. However, the survey data have not provided sufficient information to determine distribution and abundance of this species.

3.8.4.5.4 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 as well as reduce prey species available.

3.8.4.6 LeConte's Thrasher (*Toxostoma lecontei*)

3.8.4.6.1 Status

The LeConte's thrasher is recognized by the CDFG as a species of special concern.

3.8.4.6.2 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.

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 (CNDDDB 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.

3.8.4.6.3 Distribution and Occurrence within the Planning Area

Within the Planning Area, the creosote bush scrub vegetation community and the desert washes on the eastern side may provide suitable habitat for the LeConte's thrasher. The BLM has conducted surveys (point counts) for this species within the Planning Area during the last four seasons. However, this survey data have not provided sufficient information to determine distribution and abundance of this species.

3.8.4.6.4 Threats

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

3.8.4.7 Lowland Leopard Frog

3.8.4.7.1 Status

The lowland leopard frog is recognized by the CDFG as a species of special concern.

3.8.4.7.2 Life History

The lowland leopard frog is about 2 to 3 inches long and is a tan, brown, light green to bright green color. This frog appears to stay close to water, seeking shelter in streamside vegetation. Throughout most of its range, the lowland leopard frog is found in streams, riverside channels, springs, ponds, and stock ponds in desert, grassland, and woodland. Lowland leopard frogs most likely forage on a variety of invertebrates. Throughout most of its range, mating and egg-laying occurs from January to April, with possibly two breeding episodes. Eggs are laid in the water (California Reptiles and Amphibians 2009).

3.8.4.7.3 Distribution and Occurrence within the Planning Area

In California, this frog has historically ranged from San Felipe Creek, Imperial County east to the lower Colorado River Valley. This species is native to the lower Colorado River and natural overflow lakes and tributary streams in the Imperial Valley. Isolated populations may remain in the Imperial Valley and the San Felipe Creek drainage (California Reptiles and Amphibians 2009). To date, the BLM has not conducted any surveys for this species within the Planning Area. Therefore, distribution and abundance data do not currently exist.

3.8.4.7.4 Threats

The spread of introduced *Rana berlandieri*, predatory crayfish, fish, bullfrogs, habitat alteration by agriculture, grazing, development, and building of reservoirs have all been mentioned as possible contributors to the decline of the lowland leopard frog.

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

3.8.4.8.1 Status

Couch's spadefoot toad is recognized by the CDFG as a species of special concern.

3.8.4.8.2 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 through September during rainfall periods. They require friable soil for burrowing where they typically spend up to 11 months underground until sufficient rainfall has occurred. Couch's spadefoot toad has historically been observed in the northeast portion of the Planning Area after large rain events.

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.

3.8.4.8.3 Distribution and Occurrence within the Planning Area

In California, the Couch's spadefoot toad occurs within Imperial, Riverside, and San Bernardino counties between 500 and 3,000 feet elevation. Scattered populations are known between Amos and Ogilby on the eastern boundary of the Planning Area. This species may occur in the microphyll woodland, desert dry wash, and creosote bush scrub habitats in the eastern portion of the Planning Area.

3.8.4.8.4 Threats

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

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

3.8.4.9.1 Status

The CDCA Plan was amended in 2004 for the adoption of the *Flat-tailed Horned Lizard Rangelwide Management Strategy, 2003 Revision, An Arizona-California Conservation Strategy*. This strategy provides a framework for conserving sufficient habitat to maintain four viable populations of the flat-tailed horned lizard throughout the species' range. The flat-tailed horned lizard is listed as a California Species of Special Concern. In 1988, a petition was submitted to the California Fish and Game Commission (CFGF) 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 (USFWS 1993). In 2006, the USFWS withdrew the proposal to list the flat-tailed horned lizard (USFWS 2006). More recently, the USFWS has been instructed by a federal district court to reinstate the listing proposal for this species. In March 2011, the USFWS determined that the listing of the flat-tailed horned lizard as a threatened species under the ESA is not warranted, and the USFWS withdrew their 1993 proposed rule to list the species under the act (2011).

3.8.4.9.2 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 dorsal 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 post-anal 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.).

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 vegetation communities. 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).

3.8.4.9.3 Distribution and Occurrence within the Planning 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 California, Mexico. 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).

Suitable habitat for the flat-tailed horned lizard is found in the eastern portion of the Planning Area from Ogilby Road extending south to the All-American Canal (Federal Energy Regulatory Commission [FERC] 2007). Monitoring conducted as part of the North Baja Pipeline Project in 2000 and 2001 detected flat-tailed horned lizard in this area (FERC 2007). Rado noted that sand sheets extending east from the sand dunes provide favorable habitat for about one mile northwards from the intersection of Ogilby Road and I-8 (Rado 1995).

The surveys conducted by the BLM in 1978, 1979, and 1980 revealed that the highest abundance of this species occurs southwest of the Planning Area 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 community. Surveys conducted in 2001 in the East Mesa ACEC (as well as other areas in the vicinity of the ISD) found that the lizard detection rates were not significantly different from those conducted in 1979, and no significant trend was detected. The 2001 surveys found no consistent association between vehicle impacts and lizards found; however, the inconsistency may have been due to the confounding effects of weather, habitat quality, and other human impacts or to the small sample size and insensitive methodology (Wright 2002). In 2002, monitoring for the flat-tailed horned lizard in the ISD found a very low density of flat-tailed horned lizard habitat within the recreation area. A higher density of lizards as well as habitat was found in the wilderness (Wright 2003).

Although this species is known to occur in the central ISD SRMA, the habitat is considered to be marginal because of the lack of suitable soil structure required to support their predominant prey: harvester ants (BLM 2001c). The flat-tailed horned lizard management area within the East Mesa ACEC is shown in Map 3-4.

3.8.4.9.4 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 recreation, waste disposal sites, military activities, pesticide use, and USBP activities (Flat-tailed Horned Lizard Interagency Coordinating Committee 2003). The Argentine ant (*Linepithema humile*), an invasive species, was considered as a possible threat, but dismissed as such, since the climate at the dunes is too dry for Argentine ants to survive.

3.8.4.10 Colorado Desert Fringe-toed Lizard (*Uma notata*)

3.8.4.10.1 Status

The Colorado Desert fringe-toed lizard is listed by the CDFG as a species of special concern.

3.8.4.10.2 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 post-anal 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 vegetation communities. 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.

The range of this species is from the vicinity of the Salton Sea and the Planning Area, south across the Colorado River Delta to the Gulf of California and Tepopca Bay in Baja California, Mexico. 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.

3.8.4.10.3 Distribution and Occurrence within the Planning Area

The Colorado Desert fringe-toed lizard is known to occur within the Planning Area. To date, the BLM has conducted several surveys for fringe-toed lizards within the Planning Area.

3.8.4.10.4 Threats

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

3.9 Wildland Fire Ecology and Management

3.9.1 Fire Regimes and Risk Conditions

Fire regime refers to the nature of fires occurring over long periods of time and the prominent immediate effects of fire that generally characterize an ecosystem (Brown 2000). Fire regimes can be defined through the attributes of frequency, seasonality, size/spatial extent, rotation (or fire cycle), predictability (or variation in fire frequency), and magnitude (both intensity and severity) (Agee 1993; Morgan et al. 2001). Fire regimes can be subdivided into components that vary in time, space, and magnitude; however, fire regime descriptions are often limited to the frequency and severity of wildfires.

Fire regimes vary considerably by both vegetation types and landscape characteristics. The vegetated lands in the Planning Area are classified as Fire Regime V (fire frequency of over 200 years with high severity).

Current condition classes are a function of the degree of departure from historical fire regimes resulting in alterations of key ecosystem components such as species composition, structural stage, stand age, and canopy closure. One or more of the following activities may have caused this departure: fire exclusion or suppression, vegetation management, introduction and establishment of exotic plant species, insects or disease (introduced or native), or other past management activities (Hann and Bunnell 2001).

Table 3-9 displays the current fire regime condition classes, based on degree of departures from historical/natural fire regimes, for the vegetated lands in the Planning Area. The vegetated lands in the Planning Area are mostly classified as Condition Class 1 (fire regimes within the historical range).

The Planning Area is covered under the CDCA Fire Management Plan.

**TABLE 3-9
CURRENT CONDITION CLASSES BASED ON
DEPARTURES FROM HISTORICAL FIRE REGIMES**

Condition Class (CC)	Description	BLM Lands within Planning Area (acres)
CC1	Fire regimes are within a historical range and the risk of losing key ecosystem components is low. Vegetation attributes (species composition and structure) are intact and functioning within a historical range.	214,930
CC2	Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components is moderate. Fire frequencies have departed from historical frequencies by one or more return intervals (either increased or decreased). This results in moderate changes to one or more of the following: fire size, intensity and severity, and landscape patterns. Vegetation attributes have been moderately altered from their historical range.	--
CC3	Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals. This results in dramatic changes to one or more of the following: fire size, intensity and severity, and landscape patterns. Vegetation attributes have been significantly altered from their historical range.	--

Source: Hann and Bunnell 2001

3.9.2 Fire Management Units and Wildfire History

The Planning Area falls within the ISD Fire Management Unit and is covered under the CDCA Fire Management Plan. Wildfire history is closely related to vegetation and climatic patterns in terrestrial ecosystems. Patterns of fire frequency, season, size, severity, and uniformity are functions of existing vegetation conditions, weather, elevation, physiographic features, ignition sources, and fire suppression activities.

The number of fires varies from year to year in the Planning Area, and fire frequency is very low. There have been no recorded fire incidents for the last five years (G. Hill pers. comm. 2011). Most fires that have occurred within the Planning Area have burned less than 1 acre. Fires typically occur along the canal in the canal-influenced vegetation. Human-caused fires tend to be associated with out of control campfires or vehicles. Depending on the location of the fire, either Imperial County Fire Department or Winterhaven Fire Department (whichever is closest) responds to the fire.

California Department of Forestry and Fire Protection (CAL FIRE) and BLM operate under a Cooperative Fire Protection Plan which states that CAL FIRE is to consider BLM's resource protection standards to select the least cost/least damaging suppression strategy (Appendix K). On all vegetation fires within the Planning Area, BLM is required to send a resource advisor to work directly with the CAL FIRE incident commander to fully protect or at least mitigate resource values.

3.10 Cultural Resources

The Planning Area contains evidence of human activity from prehistoric times to the present. The eastern desert of Imperial County served as a transportation corridor for early occupants of the Imperial Valley; however, the Algodones dune fields, which form a natural barrier for overland travel, forced most travelers to seek routes to the north or south of the Planning Area until the early twentieth century.

3.10.1 Prehistoric Context

The prehistory of Imperial County is typically divided into four major temporal periods: Early Man (prior to 12,000 years Before Present [BP]), Paleoamerican (12,000 to 8,000 BP), Archaic (8,000 to 1,500 BP), and Late Prehistoric (1,500 to 470 BP). These time periods are expressed through various regional archaeological complexes or archaeological cultures.

3.10.1.1 Early Man Period

A pre-projectile point period is posited by some researchers for the greater Southwest, which includes Imperial Valley. The cultural complex that typifies this period in the region is called the Malpais Pattern. Malcolm Rogers first used the term Malpais to refer to very early materials, which he later reclassified as San Dieguito I (Rogers 1939). Julian Hayden (1976) revised the term to refer to a pre-San Dieguito complex consisting of heavily varnished choppers, scrapers, and other core-based tools typically found on ancient desert pavement areas. The assemblage lacks projectile points. Malpais materials are posited to predate the Paleoamerican or Lake Mojave/San Dieguito materials (Hayden 1976), but obtaining radiocarbon or other absolute dates for these materials has proven very elusive. Some scholars are quite skeptical of posited early occupations (Schaefer 1994). There are no sites within the Planning Area that have been identified as dating to the Early Man period (Moratto 1984).

3.10.1.2 Paleoamerican Period

The Paleoamerican period spans the late Pleistocene and early Holocene, about 12,000 BP to about 8,000 BP. The earliest part of the Paleoamerican period in the region is

represented by the Fluted Point Tradition. Fluted points have been well documented and dated for the Rocky Mountain and Great Plains areas (Haury 1975; Hester 1972; Jennings 1978; McGuire and Schiffer 1982). In these regions, they are often associated with big game kill sites. In the Great Basin and California, however, their dating is more problematic. They are typically found along the shorelines of Pleistocene playas in the deserts, along fossil streams, and in passes connecting such places (Fredrickson 1973; Riddell and Olsen 1969). Some researchers suggest that these sites reflect a lacustrine or riparian adaptation ancestral to the Western Pluvial Lakes Tradition or Lake Mojave–San Dieguito Tradition that developed after about 12,000 BP (Moratto 1984).

The San Dieguito–Lake Mojave Complex is thought to have existed approximately 10,000 to 7,000 years ago during a time of greater effective moisture than the present in southeastern California (Warren and Crabtree 1986). The assemblage consists of heavy percussion, core, and flake-based tools: domed and keeled choppers, planes, and scrapers. One also finds light-percussion flaked spokeshaves, flaked-stone crescent-shaped tools, and leaf-shaped projectile points. Fluted points are also occasionally found on Lake Mojave–San Dieguito surface sites (Moratto 1984). Milling equipment is apparently rare or absent (Warren and Crabtree 1986).

Subsistence is generally thought to have been focused on highly ranked resources such as large mammals. This subsistence strategy may have encouraged a pattern of relatively high residential mobility. Some cleared circles, trails, and geoglyphs in the Colorado Desert (Imperial County) have been tentatively included in the San Dieguito–Lake Mojave Complex. Temporal placement of these sites is based on degree of embeddedness in desert pavements and patination, a dating method that has not been proven reliable (Hayden 1976; McGuire 1982; Rogers 1939). There are no sites within the Planning Area that have been identified as dating to the Paleoamerican period, but a number of San Dieguito Sites have been identified in Imperial County and elsewhere in the Colorado Desert (Cleland et al. 2003; Moratto 1984; Pendleton et al. 1986; Underwood and Cleland 2002).

3.10.1.3 Archaic Period

The early Archaic Period is represented by the Pinto Complex (7,000 to 4,000 BP) in the Colorado Desert. There is an apparent shift to a more generalized economy and a gradually increased emphasis on the exploitation of plant resources. The groundstone artifacts associated with the Pinto Complex are typically thin slabs with smooth, highly polished surfaces, not the basin metates and manos typical of later times. Rogers (1939: 52-53) argued that the thin, polished “slab metates” were not milling stones, but rather were used to process fibrous leaves or skins. Projectile points consist of the distinctive Pinto series atlatl points made with a less refined, hard hammer percussion technique. The assemblage also includes scrapers, knives, scraper-planes, and choppers. The mixed core-based tool assemblage of the Pinto Complex may indicate a range of

adaptations to a more diversified set of plant and animal resources brought about by a generalized desiccating trend in the West, punctuated by occasional, more mesic times. The early component at the Indian Hill Rockshelter in Anza-Borrego Desert State Park, approximately 70 miles west of the Planning Area, has been dated to this period. In general, archaeological sites dating to this period are rare in the Colorado Desert and none have been identified within the Planning Area (Cleland et al. 2003).

The late Archaic Period (4,000 to 1,500 BP) is represented by the Gypsum Complex (or Amargosa Complex). The assemblage consists of fine, pressure flaked Elko, Humboldt, and Gypsum Series projectile points, leaf-shaped points, rectangular-based knives, flake-based scrapers, drills, and occasional large, core-based scraper-planes, hammer stones, and choppers. Manos and basin metates become relatively common, and the mortar and pestle were introduced late in the complex (Warren 1984; Warren and Crabtree 1986). The development of more tool types and the addition of hard-seed processing equipment (metates) suggest a more effective adaptation to desert conditions in the region. No Gypsum Complex sites have been identified within the Planning Area (Russell et al. 2002), but the deposit at Indian Hill Rockshelter in eastern Imperial Valley has a Gypsum Complex component, and others have been noted in the adjacent Colorado Desert (McDonald 1992).

3.10.1.4 Late Prehistoric Period

The Late Prehistoric Period, local manifestations of which are often called the Patayan Pattern or Patayan Complex (1,500 to 470 BP), is characterized by dramatic cultural change and a dramatically expanded population in the Salton Trough. Paddle and anvil pottery was introduced, probably from Mexico by way of the Hohokam culture of the middle Gila River area (Schroeder 1975, 1979; Rogers 1945). A subsistence shift from hunting and gathering of desert and river resources (Patayan I) to floodplain horticulture (Patayan II) took place at this time along the Colorado River and perhaps along the Alamo River and New River (Baksh 1994; Forde 1931; Kroeber 1925). Cottonwood Triangular series projectile points and Desert Side-notched Series projectile points (signifying the advent of the bow and arrow), as well as Lower Colorado Buffware pottery, appear at approximately 1,250 BP in the Colorado Desert (Heizer and Hester 1978; Waters 1982). Burial practices also shifted from inhumations (burials) to cremations. Numerous trails that appear to date to this period throughout the Colorado Desert suggest the growing importance of long and short distance travel for trading expeditions, religious activities, visiting, and warfare. Other culture traits generally associated with the Patayan Complex include increasingly elaborate kinship systems, expanded trade networks, and rock art, including ground figures which include the famous geoglyphs or ground figures found along the Colorado River (Davis 1961; McGuire 1982; Warren 1984). The greatly increased number of Late Prehistoric Period archaeological sites suggests an expansion of population. The settlement pattern is characterized by small mobile groups living in seasonal settlements along the Colorado

River floodplain. These locations were influenced by the filling and desiccation of Lake Cahuilla at least four times during this period (Schaefer 1994). The majority of the prehistoric sites (ceramic scatters) within the Planning Area are included in this time period.

3.10.2 Ethnographic Context

The Planning Area was used prehistorically by a variety of Native American groups, including the Kumeyaay (the Kamia is a subset of this group), the Cocopah, and the Quechan. These three groups speak the language of the Yuman family of the Hokan language stock (Kroeber 1920). Short descriptions of their individual ethnographic context are outlined below. The Paipai, the Chemehuevi, the Mohave, and the Cahuilla also used the Planning Area for travel and trade (Russell et al. 2002). The extreme aridity of the Planning Area 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 where a range of plant and animal resources occur. The dune margins to the east support a microphyll woodland plant community that consists of deciduous, deep-rooted trees such as honey mesquite, ironwood, desert willow, blue palo verde (*Cercidium floridum*), little-leaf palo verde (*Cercidium microphyllum*), and smoke tree. Shrubs include catclaw acacia (*Acacia greggii*), cheesebush (*Hymenoclea salsola*), and chuparosa (*Justicia californica*). These plants attract various birds. The high dunes have little vegetation but include desert buckwheat (*Eriogonum deserticola*), sand-food (*Pholisma sonora*), sand verbena (*Abornia villosa*), dune primrose (*Oenothera deltoids*), desert lily (*Hesperocallis undulata*), and coyote melon (*Cucurbita palmata*). Lizards are common in the high dunes (Schoenherr 1992).

3.10.2.1 The Kumeyaay

It is useful to think of the Kumeyaay as three closely related groups based on differences in dialects (Langdon 1970, 1975; Luomala 1978; Spier 1923) and geography (Barker 1976; Gifford 1931): the northern Kumeyaay or Ipai, the southern Kumeyaay or Tipai, and the Desert Kumeyaay or Kamia. The northern and southern Kumeyaay were subjugated by the Franciscan missionaries and Spanish imperial forces at San Diego, and were until recently known as Diegueño. They occupied mountain and coastal areas of what is now San Diego County (Langdon 1970, 1975; Luomala 1978; Spier 1923). The term Kamia, like Kumeyaay, has been used to refer to all three divisions (e.g., Forbes 1965), but now is most commonly used to refer only to the desert division. In the following discussion, Kumeyaay refers to the Ipai and Tipai of San Diego County and Baja California Norte, while Kamia refers to the desert branch.

Traditional Kumeyaay territory covered the southern two-thirds of San Diego County, from Agua Hedionda (south of Carlsbad) south to some 20 miles below Ensenada, Baja

California Norte. On the west, Kumeyaay territory started at the Pacific Ocean and extended to the mountains of the Peninsular Range and into the desert (Cline 1984; Gifford 1931; Spier 1923). While they did not live in the Planning Area, the Kumeyaay did travel to Imperial County to trade.

The Kumeyaay lived in semi-sedentary, politically autonomous villages or rancherias. A settlement system typically consisted of two or more seasonal villages with temporary camps radiating away from these central places (Cline 1984). Their economic system consisted of hunting and gathering, with a focus on small game, acorns, grass seeds, and other plant resources. The small game consisted mostly of rabbits. Bighorn sheep and deer were also hunted occasionally. Agave (mescal) was also an important food found along the arid eastern slopes of the Peninsular Range. The most basic social and economic unit was the patrilocal extended family (Luomala 1978).

Trade was an important feature of Kumeyaay subsistence. Coastal groups traded salt, dried seafood, dried greens, and abalone shells to inland and desert groups for products such as acorns, agave, mesquite beans, and gourds (Almstedt 1982; Cuero 1970; Luomala 1978). Travel and trade were accomplished by means of an extensive network of trails, some of which traversed Imperial Valley and passed by or through the Dunes. Kumeyaay living in the mountains of eastern San Diego County frequently used these trails to travel down to the Kamia settlement of *Xatopet*, located in Imperial County, to trade and socialize in winter (Castetter and Bell 1951; Gifford 1918; Spier 1923; Woods 1982).

3.10.2.1.1 The Kamia

Gifford suggests that the precontact population of the Kamia “could not have been more than a few hundred” (1931). Their traditional territory included the southern Imperial Valley from the latitude of the southern half of the Salton Sea to well below what is now the U.S.–Mexico border. On the west, Kamia Territory extended to the foothills of the Peninsular Mountains, and on the east, Kamia territory extended up to the sand dunes (Forbes 1965; Luomala 1978). It included a piece of territory east of the Cocopah Mountains along New River/Hardy River extending to within perhaps 25 miles of the Gulf of California. The Kamia lived at times along the west bank of the Colorado River among the Quechan, but their main settlements were along the New and Alamo rivers (Gifford 1931). Because of the wide variation in the water supply, the Kamia often had to move from one planting area to another. They also gathered and hunted over a very large area.

Subsistence among the Kamia consisted of hunting and gathering, and floodplain horticulture (Barker 1976; Gifford 1931). In normal years, the Colorado River would overflow its banks in the spring and early summer and fill the delta tributaries of rivers such as the New and Alamo. When the floodwater receded, the Kamia would plant maize, black-eyed beans (cowpeas), tepary beans, watermelons, pumpkins, and gourds

in the mud (Gifford 1931). Watermelons were introduced by Europeans prior to 1700 when Father Eusebio Francisco Kino made his trip through the dunes (Castetter and Bell 1951). Kino had traveled from Sonora, Mexico, to the vicinity of present-day Yuma and determined that Baja California was not an island. He also founded San Xavier del Bac in 1700 and explored the confluence of the Gila and Colorado (Bolton 1932). Black-eyed beans were also introduced by Europeans prior to 1775 (Castetter and Bell 1951). The Kamia had a small dam at *Xatopet* on the east/west portion of the Alamo River to control water flow and allow farming in years when water flow was insufficient. Likewise, small dams and ditches used to irrigate crops were also reported in the vicinity of Algodones–Pilot Knob (Castetter and Bell 1951). Gifford (1931) and Castetter and Bell (1951) suggested these were recent adaptations and not traditional. Bean and Lawton (1973), Lawton and Bean (1968), and Shipek (1988) argue that irrigation was indigenous.

For all the Colorado River people, including the Kamia, the major food staple was mesquite and screwbean trees, called *anxi* and *iyix*, respectively by the Kamia (Gifford 1931). Seeds of ironwood and palo verde trees were also used; however, neither tree was considered a particularly desirable food resource (Castetter and Bell 1951). The eastern edge of the dunes contains these trees in the microphyll woodlands (Schoenherr 1992). Acorns were gathered in the mountains to the west of Kamia territory in October and acquired through trade from the southern Kumeyaay (Gifford 1931).

Hunting contributed to the diet in a minor way in terms of overall caloric intake, but provided valuable protein, and material for clothing, blankets, and tools. Small game, primarily rabbits, was most frequently taken, using bow and arrow or a rabbit stick (*macana*). Fires were sometimes set along sloughs to drive rabbits out. Individuals with bow and arrow also hunted deer and mountain sheep. Fish were also taken in sloughs with bow and arrow, by hand, hooks, and basketry scoops. Seine nets were larger than scoops and were used by six men to catch fish in the Colorado River, lakes, and large sloughs (Gifford 1931). Fish provided the main source of protein for all the tribes along the Colorado River. Salt was obtained 2 to 3 miles southwest of the Algodones Dunes (Gifford 1931).

3.10.2.2 The Cocopah

The Cocopah lived on the west side of the Colorado River delta from the tidewater area, north to a little above the latitude of Volcano Lake or Cerro Prieta, several miles south of the U.S.–Mexico border (Castetter and Bell 1951; Gifford 1933; Kroeber 1920). Like other river Yumans, the Cocopah settlements were dispersed residential areas or rancherias, not close-knit villages (Castetter and Bell 1951).

Cocopah subsistence was similar to other river Yuman people, although their location in the Colorado River delta area had a somewhat different environment from that of the upstream tribes. The Colorado River frequently changed course within the general

floodplain throughout the area below the Grand Canyon. The river formed very active meanders in the delta region, requiring settlement and field movement among the Cocopah and other delta peoples (Castetter and Bell 1951; Sykes 1937). Mesquite and screwbean grew in profusion and formed a dietary staple of the Cocopah, as it did for other Yuman people. Other important wild food sources of the delta region were “wild rice or wild wheat,” and *quelite* or amaranth (Castetter and Bell 1951). Castetter and Bell (1951) suggest that the Cocopah utilized wild plant foods more extensively than other river Yumans, obtaining only about 30 percent of their food from horticulture. The Cocopah planted a variety of maize, pumpkins, tepary beans, cowpeas, muskmelons, watermelons, and heshmicha (a grain resembling wheat), and sugar cane (Gifford 1933). As mentioned above, the cowpeas and watermelons were adopted from Europeans. Hunting was relatively unimportant and was confined primarily to the hills and mountains. Fish was the most important animal food among Lower Colorado River peoples. The Cocopah fished in the Colorado and Hardy rivers, and occasionally parties would fish along the Gulf of California. Fish were also taken with bow and arrow, as well as spears, gill nets, and dip nets (Castetter and Bell 1951; Gifford 1933).

The Cocopah frequently visited the mountainous Paipai country west of the delta to trade and to gather pine nuts and acorns. Tobacco, mescal, and mountain sheep skins were obtained from the Paipai in exchange for delta foodstuffs. The Cocopah also obtained tobacco and eagle feathers from the Kumeyaay (Castetter and Bell 1951; Kelly 1977; Sample 1950). At times, the Cocopah traded seashells to the Kamia (Gifford 1931:37). They also visited frequently with the Maricopa, their allies, on the middle Gila River, and with the Halchidhoma who lived in the Blythe area from about 1700 to 1830 (Gifford 1933; Kelly 1977).

3.10.2.3 The Quechan Tribe of the Fort Yuma Reservation

The Quechan (*Kwatsan*) were formerly called the Yuma Indians. Their territory was centered at the confluence of the Gila and Colorado rivers (present-day Yuma, Arizona), but extended north on the Colorado River about 60 miles, and about 30 miles up the Gila River. Records from Father Kino stated that the Quechan also lived on the west side of the Colorado River. According to Quechan tradition, the northern boundary was in the vicinity of Blythe and the southern boundary reached into Baja California and Sonora, Mexico. The lands claimed generally extend from about 8 miles northwest of Blythe down both sides of the Colorado River to some 20 miles below its confluence with the Gila River. The claimed area also encompasses about 10 miles on either side of the Gila River eastward to the Metate Mountains. It includes an area extending from the confluence near the International Boundary with Mexico, bound on the southwest by a line of sand hills, almost to the Salton Sea (Indian Claims Commission 1959).

The northern part of the area claimed by the Quechan includes the southern part of the “Great Colorado Valley,” which stretches along the Colorado River from Parker, Arizona,

downstream to Picachio, California (Indian Claims Commission 1959). Their neighbors on the northwest were the Cahuilla and Luiseño, and to the west the Kamia. Their eastern boundary was just west of Gila Bend, Arizona (Miguel n.d., cited in Bee 1982).

The Quechan are not mentioned by Alarcon or Diaz at the time of first Spanish contact in 1540. The next visitor to the area, Juan Oñate, estimated a population of about 4,000 in 1604 (Bee 1983; Forbes 1965). He mentioned a stable horticultural and gathering economy. Throughout winter and spring, the Quechan lived in large, seasonal settlements or rancherias located on terraces above the Colorado River floodplain. These winter settlements were moved from time to time, and establishing their precise locations is problematic (Bee 1982, 1983; Forde 1931). When the floodwaters of spring receded, the Quechan left their winter villages on the river terraces and dispersed into camps near their 2- to 3-acre horticultural plots distributed along the river floodplain. Extended families resided in these camps. Planting was done in the mud as the river receded. Major crops included maize, squash, pumpkin, watermelon, and wheat (Castetter and Bell 1951). Wheat was introduced by Kino in 1700 (Castetter and Bell 1951). After the fall harvest season, the Quechan would reconvene in villages on terraces above the river to avoid seasonal flooding (Bee 1983; Forde 1931).

Quechan villages were actually a collection of houses, or rancherias, dispersed along the Colorado and Gila rivers. Households consisted of composite families that lived together and moved, more or less as a unit, from place to place within a constantly changing floodplain environment. The annual flood of the Colorado constantly changed the gardening areas, eroding some and burying others under tons of silt. This undoubtedly changed the desirability of potential village sites, camp sites, and garden plots from time to time. The Quechan burned the houses and possessions of the dead (Bee 1982, 1983; Forde 1931; Trippel 1889), which also contributed to the movement of villages from time to time (Trippel 1889). Like other Lower Colorado Yuman peoples, the Quechan moved through their territory in a very dynamic cultural landscape (Bee 1982, 1983; Forde 1931).

Despite the proximity of the Quechan settlements to the Planning Area, there is almost no mention of the dunes in their trade and travel accounts. The dunes were used as a plant gathering place. Plants included desert lily, sandroot, berries, cactus, and cattails (Russell et al. 2002). According to Russell et al. (2002), the Algodones Dunes were not significant for subsistence and daily life. The dunes are significant, however, as a boundary area. They also have spiritual significance since they figure in Quechan origin accounts and other parts of their oral traditions. The Quechan and other tribes used trails that passed south and north of the dunes, as well as through the dunes at Buttercup Pass—the area where I-8 and the All-American Canal cross the dunes, and the Glamis area—where SR-78 passes through the dunes (Russell et al. 2002).

3.10.3 Historic Context

The first Spanish exploration of southern California began when Hernando de Alarcón sailed up the Colorado River, probably to the confluence of the Gila or the Yuma area in August of 1540 (Forbes 1965). In September 1540, Melchior Diaz marched from Sonora, Mexico, to the confluence of the Colorado and Gila rivers (Lawton 1976). Cabrillo sailed up the Pacific coast in 1542 and discovered San Diego Bay and other places along the coast of Alta California (Pourade 1960).

In 1769, the first European settlement of Alta California occurred with the founding of the mission and presidio at San Diego. This created a need for a travel route linking Sonora to Alta California. The Franciscan Padre Francisco Garcés was the first to explore the area west of Yuma, beginning near Tucson in 1771 and exploring the Colorado River delta and the area just southwest of the Planning Area (Forbes 1965; Pourade 1960; Lawton 1976).

The first Spanish explorer to enter the Imperial Valley was Lieutenant Pedro Fages, who rode along the northwestern edge of the Colorado Desert while looking for army deserters from the San Diego Presidio in 1772. He apparently entered the desert on an Indian trail he discovered, which led through Oriflamme Canyon to Carrizo Creek and the desert floor (Bolton 1931; Lawton 1976; Pourade 1961).

The first Juan Bautista de Anza expedition (which included Padre Francisco Garcés) set out from Tubac, Sonora, in January 1774 and arrived at Yuma a month later. Avoiding the Algodones Dunes west of Yuma, the expedition headed south to Laguna de Merced, then west. Anza re-entered what is now the United States in Imperial Valley west of Signal Peak. His route then went to what he called Santa Rosa de las Lajas (now known as the Yuha Well) in the Yuha Desert south of Plaster City. From there the expedition continued north through the Yuha Desert and went through what is now the community of Borrego Springs and north to San Gabriel (Forbes 1965). A second Anza expedition utilized the same general route through the Imperial Valley in 1775 and brought settlers to found the pueblo of Los Angeles. The Yuma route was abandoned in 1781 after the Quechan destroyed the Spanish settlements near Yuma (Forbes 1965).

In the 1820s, Mexicans began using the route again, and it became known as the Sonora Road (Warren, E. et al. 1981). In 1846, during the Mexican–American War, the Army of the West under General Stephen Watts Kearney and the Mormon Battalion led by Colonel Phillip St. George Cooke also followed the same route. The war ended with the Treaty of Guadalupe Hidalgo, signed on February 2, 1848. After the discovery of gold in California in 1849, the route became a popular, all-weather route known as the Southern Emigrant Trail (Pourade 1963). In 1857, a portion of the route was used for the first transcontinental mail route (Birch's San Antonio-San Diego Mail Line) between San Diego and the east. In late 1858, the route was followed by the better known Butterfield Southern Overland Mail Line. Beginning with Anza, all these routes crossed the

Colorado River in the Yuma vicinity, passed south of Pilot Knob and the sand dunes, and headed west through northern Baja California. The routes re-entered the United States in western Imperial County and then headed north (van Wormer et al. 2007).

The San Diego to Fort Yuma Wagon Road was opened in 1865. The same basic route was followed by Old Highway 80, although there were several variations (Wray 2004). In 1873, a military telegraph line was installed from San Diego to Fort Yuma paralleling the road (Elliott 1883).

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 Planning Area. It is the same railroad that is now known as the UPRR. Double tracks have been added to some segments of the UPRR since the mid-1880s (Sander and Maxon 2007). Regular service on the route began in 1877 (Pourade 1964). These old steam locomotives had to stop and take on water every few miles, and small communities such as Pilot Knob, Ogilby, and Glamis developed at some of the stops along the line. After 1901, and the opening of the Imperial Canal, the Imperial Valley experienced considerable population growth. The availability of Colorado River water made this formerly barren area a highly productive agricultural region. In 1905, the river broke through the headgate of the canal and soon the entire flow of the river was rushing into Imperial Valley along what is known as New River. This flood event created what we know as the Salton Sea. Through the combined efforts of the Santa Fe and Southern Pacific railroads, Imperial Valley was saved and the break was finally closed in 1907 (Nadeau 1997). To the present day, Imperial Valley remains an important agricultural area. The Salton Sea level is maintained by agricultural runoff.

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 through the Planning Area (PHR Associates and Carrico 1989). At one time, there were 7 miles of the wooden road, providing a route that shortened travel time from San Diego to Yuma by two days (Bates 1970). The plank road was abandoned in 1926, when an asphalt road (Highway 80) was completed through Buttercup Pass linking San Diego with Tybee Island, Georgia, on the Atlantic coast.

The disastrous flooding of Imperial County from 1905 to 1907, and subsequent floods elsewhere, convinced the federal and state governments of the Southwest that major dams needed to be built on the Colorado River. The first of these, Boulder Dam, later called Hoover Dam, was completed in 1935. Despite considerable skepticism, the All-American Canal was built through the formidable sand dunes at Buttercup Pass in 1940. The All-American Canal was integral in the agricultural development and settlement of the Imperial and Coachella valleys. The area served by the All-American Canal has become one of the richest and most important agricultural areas in the United States (Queen 1999).

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 Planning Area, 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 Planning Area, for military training maneuvers (Bischoff 2008; Meller 1946 as appears in Cleland et al. 2003).

In 1964, the old transcontinental Highway 80 was replaced by I-8 through the ISD. Later, electrical transmission lines, fiberoptics cables, and other utilities passed through the Buttercup Pass corridor (Apple et al. 2006; Dominici 1981; Schaefer and Andrews 2005; Schaefer et al. 1998).

3.10.4 Previous Research

A records search was conducted at the El Centro BLM office to identify previous studies in the area and to locate known cultural resources. Forty-one investigations have been conducted and 176 cultural resources have been recorded within the Planning Area (Table 3-10).

**TABLE 3-10
CULTURAL RESOURCE PROJECTS WITHIN THE PLANNING AREA**

Author	CRM Company	Title	Year
n/a		Grays Well Bridge Construction, California Desert District, El Centro Resource Area, Imperial Sand Dunes Recreation Area	n.d
n/a	BLM	Cultural Resource Clearance of a Free-Use Permit CA-060-FP3-4	1978a
n/a	BLM	Cultural Resource Clearance on Proposed Material Sale Permit MP8-6	1978b
n/a		Draft Environmental Assessment Record East Mesa Non-competitive Leases for Geothermal Exploration/Development	n.d.
Apple et al.	EDAW	Cultural Resources Overview and Survey Report for the North Baja Expansion Project	2006
Brenzikofer, Amber	Parsons	Biological and Cultural Evaluation: Union Pacific Railroad Segment 2A – Niland to Araz Yuma Subdivision Capacity Expansion Project, Imperial County, California	2007
Bull, Charles S.	RECON	A Summarization of an Archaeological Sample of the Glamis/Dunes Area, Imperial County, California	1981

**TABLE 3-10
CULTURAL RESOURCE PROJECTS WITHIN THE PLANNING AREA**

Author	CRM Company	Title	Year
Cheever, Dayle and Judy Berryman	e2m	Cultural Resource Inventory for Proposed Construction, Operation, and Maintenance of Tactical Infrastructure for Customs and Border Protection, El Centro Sector, California	2008
Cleland, James H. and Rebecca McCorkle Apple	EDAW	Historic Properties Treatment Plan for the North Baja Gas Pipeline Expansion Project	2006
Collins, G. Edward and Jay C. von Werlhof	Imperial Valley Desert Museum	Cultural Resource Survey and Assessment of the Westside Main Flood Control (WSMFC) Area	1996
Dominici, Debra	Caltrans	Archaeological Survey Report for the Proposed Sand Hills Interchange Project	1981
Dominici, Debra	Caltrans	Archaeological Phase I Survey Report for the Proposed Ogilby Material Site	1982
Hale, Micah	ASM Affiliates	Cultural Resources Inventory for the South Dunes Operations Center	2005
Hangan, Margaret	BLM	Grays Well Bridge Road and Border Patrol Traffic Barriers	2000
Johnson, Barnhart	BLM	Glamis Gravel Free-Use Permit	1976
Maxon, James C.	Water and Power Resources Service	Cultural Resource Inventory of the Proposed Wildlife Windmill/Watering Sites along the Coachella Canal, Imperial Valley, CA	1981
McKinney, Charles M.		Glamis KGRA	1973
Nicolai, Nancy	BLM	Environmental Assessment FONSI for the Watchable Wildlife Site – Algodones Dunes	1996
Pendleton, Lorann et al.	Wirth Environmental Services	Archaeological Investigations in the Picacho Basin: Southwest Powerlink Project – Sand Hills to the Colorado River Segment	1986
PHR Associates		The Plank Road of Imperial County	1989
Queen, Rolla L.	BLM	BLM Off-Road Vehicle Bridge Off-Highway Vehicle Grant OR-1CD-172 Grays Well Bridge 96: Evaluation of Significance and Effects All-American Canal	1999
Rosenberg, Seth and Brian F. Smith	Brian F. Smith and Associates	A Class III-Intensive Field Survey for the Yuma Sector Project	2008
Russell, John C., Clyde M. Woods, and Jackson Underwood	EDAW	As Assessment of the Imperial Sand Dunes as a Native American Cultural Landscape	2002
Sander, Jay K. and Patrick O. Maxon	Chambers Group	Phase I Cultural Resources Reconnaissance for the Union Pacific Railroad, Yuma Subdivision Capacity Project, Riverside and Imperial Counties, California	2007

**TABLE 3-10
CULTURAL RESOURCE PROJECTS WITHIN THE PLANNING AREA**

Author	CRM Company	Title	Year
Schaefer, Jerry et al.	ASM Affiliates	A Cultural Resources Inventory and Evaluation of the Imperial Irrigation District's C-Line Pole Replacement Project, Imperial County, CA	1998
Schaefer, Jerry and Collin O'Neill	ASM Affiliates	A History and Evaluation of the Old Coachella Canal, Imperial County, California	1998
Schaefer, Jerry and Collin O'Neill	ASM Affiliates	The All-American Canal: An Historic Properties Inventory and Evaluation	2001
Schaefer, Jerry and Sherry Andrews	ASM Affiliates	Class II and III Cultural Resources Inventory and Evaluation for the All-American Canal Lining Project, Imperial County, CA	2005
Schaefer, Jerry and Sinead Ni Ghabhlain	ASM Affiliates	A History and Evaluation of the Coachella Canal, Riverside and Imperial Counties, CA	2003
Schaefer, Jerry and Mark Giambastiani	ASM Affiliates	A Class I Cultural Resources Inventory for the All-American Canal Lining Project	2004
Smith, David M., et al.	Chambers Group	Phase II Test and Evaluation for Cultural Resources, Union Pacific Railroad, Yuma Subdivision Capacity Project, Riverside and Imperial Counties, California	2008
Thomas, Greg		Results of a Pedestrian Survey, Osborne Overlook, Imperial County, California	2002
Underwood, Jackson and James H. Cleland	EDAW	Class II Archaeological Survey of the Imperial Dunes	2002
von Werlhof, Jay	Imperial Valley College Museum	Archaeological Survey of the Gordons Well Plantation Powerline	1986
von Werlfof, Jay and Sherilee von Werlhof	Imperial Valley College Museum	Archaeological Examinations of Certain Portions of Chocolate Mountains	1977a
von Werlfof, Jay and Sherilee von Werlhof	Imperial Valley College Museum	Archaeological Examinations of Certain Test Drill Hole Sites on Pilot Knob Mesa	1977b
von Werlfof, Jay and Sherilee von Werlhof	Imperial Valley College Museum	Addendum: Archaeological Examinations of Certain Drill Holes near Glamis, CA	1977d
von Werlfof, Jay and Sherilee von Werlhof	Imperial Valley College Museum	Archaeological Examinations of the Occidental Geothermal Incorporated Sites near Glamis, CA	1979a
von Werlfof, Jay and Sherilee von Werlhof	Imperial Valley College Museum	Archaeological Examinations of Certain Geologic Sites in Imperial Valley	1979b
Weakly, Ward F.	BLM	Archaeological Survey and Evaluation Studies for the Coachella Canal, Imperial County, CA – Colorado River Basin Salinity Control Project	1975
Weller, Pat	BLM	Field Exam of Gordons Well Bridge Site	1995

CRM = cultural resource management

3.10.4.1 Inventories

The BLM recognizes three classes of cultural resources inventories:

- Class I inventories are professionally prepared, large-scale heritage resources overviews. They consist of:
 - compilation and analysis of all reasonably available cultural resource data and literature
 - management-focused, interpretive, narrative overview
 - synthesis of the data

The overview also defines regional research questions and treatment options.

- Class II inventories are sample field surveys. This means that only a portion of a particular study area is selected for survey, typically on the basis of a stratified, probabilistic sample. The areas selected for survey are thoroughly examined to locate and record all heritage resources, so in a sense these sampled sections within a Class II inventory are similar to a Class III inventory. The sampled portions of Class II inventories and Class III inventories are recorded as surveys in the California Historical Resources Information System. Class II inventories are typically used to provide overviews for large study areas. These studies attempt to characterize the site distribution, site density, and diversity in a particular study area.
- Class III inventories are intensive field surveys. They consist of complete coverage of a particular study area. The goal of a Class III inventory is to locate and record all heritage resources within the survey area and to provide provisional NRHP evaluations based primarily on site surface data.

At least 41 archaeological studies have been conducted within the limits of the Planning Area (see Table 3-10). Two of these were Class I inventories, two were Class II inventories, and thirty of these were Class III inventories. The other seven investigations included historic treatment plans, historic contexts, evaluation studies, and a cultural landscape investigation. The earliest documented study occurred in the 1950s; about half of the surveys were carried out in the 1970s and 1980s, and the other half was carried out after 1995. Many of the inventories were associated with linear projects (canals, pipelines, and transmission lines). An exception to this was a major sample survey effort (Class II) that the BLM conducted in the late 1970s and early 1980s. In this study, a large number of one-mile by one-quarter-mile transects were surveyed throughout the Planning Area (Bull 1981).

In 2002, the BLM contracted for an extensive cultural landscape study of the Planning Area (Russell et al. 2002) in order to determine if the sand dunes system qualified as

one large traditional cultural property. The study began with an extensive review of the ethnographic and ethnohistoric literatures. This was followed by contacting eight Native American tribes with heritage associations with the Planning Area. Tribal representatives were interviewed about present and past use of and the spiritual and cultural connections with the entire sand dunes system. The results of the interviews and the literature reviews indicate that the Planning Area or the sand dunes system has some cultural significance for contemporary Native Americans, but does not meet the NRHP criteria to be a traditional cultural property. All groups interviewed expressed concern about damage to the dunes landscape by recreational use (Russell et al. 2002).

A Class II archaeological survey was conducted in 2002 in order to supplement the cultural landscape study. A stratified systematic random sample survey of three percent of the entire dune system and an additional two percent sample of the Quaternary alluvium within the dunes and dune edges was undertaken in the spring of 2002 (Underwood and Cleland 2002). This five percent sample of the dune system yielded four archeological sites: three pottery sherd scatters and a historic military marksmanship training site.

Despite a number of studies having been conducted, most of the Planning Area has not been inventoried for cultural resources. Based on the records search results, the level of survey appears to vary in different parts of the Planning Area. The southern portion of the Planning Area has been subject to the most survey investigations. These investigations were generally associated with infrastructure projects, such as the lining project for the All-American Canal, and the sample surveys conducted in the late 1970s and early 1980s (Bull 1981) and in 2002 (Underwood and Cleland 2002).

3.10.4.2 Cultural Resources

Both prehistoric and historic cultural resources have been recorded within the Planning Area. Prehistoric sites include lithic scatters, ceramic scatters, ground stone scatters, habitation sites or temporary camps, cremations, a prehistoric trail, a quarry, and a rock feature. Lithic scatters consist of sites containing more than three chipped or flaked stones resulting from human manipulation. Artifacts found in lithic scatters include flakes, debitage, and/or flaked stone artifacts. Ceramic scatters consist of a collection of more than three pot sherds. Ground stone scatters consist of a collection of more than three manos, metates, or other ground or pecked stone artifacts. A habitation site or temporary camp consists of a wide range of artifacts types and may have features. A cremation consists of human remains/bones that have been burned to the point of appearing calcined. A prehistoric trail is a linear feature formed through repetitive use. A quarry contains a source of lithic material with evidence of human use. A rock feature consists of a patterned arrangement of rocks purposefully constructed (adapted from California Office of Historic Preservation 1995).

Historic period sites documented within the Planning Area include trash scatters, the All-American Canal, the Old Coachella Canal, the Southern Pacific Railroad and associated railroad sites (former stations and trash scatters), the Pilot Knob to Drop 4 Transmission Line, border monuments, a dry lake bed, a graveyard, a machinery repair workshop, a rock feature, the Old Plank Road, Old Highway 80, and military encampments. Historic trash scatters consist of a collection of items at least 50 years old such as metal cans and glass bottle fragments. A rock feature refers to a patterned arrangement of rocks that dates to the historic era. Associated railroad sites include trash scatters, railroad graded areas, and abandoned stations with foundations and pads. Military encampments may consist of collections of fired ammunition and other historic artifacts.

There are 176 cultural resources recorded in the Planning Area. As Table 3-11 below indicates, most of these are prehistoric archaeological sites, representing a range of activities described above. Fewer historic period resources reflecting the major historic themes of the region—mining, transportation, irrigation projects, and military activity—have been identified.

**TABLE 3-11
PLANNING AREA CULTURAL RESOURCE SUMMARY**

Resource Category	Number of Items Recorded
Prehistoric Resources	
Lithic scatters	10
Ceramic scatters	53
Habitation areas/temporary camps	5
Ground stone scatters	4
Cremation	3
Isolated finds	26
Other	3
Subtotal	104
Historic Period Resources	
Trash scatter/dump	16
Military encampment	2
Road	4
Canal	2
Transmission line	1
Rock feature	1
Border monument	3
Railroad	13
Graveyard	1
Isolated finds	16
Other	2
Subtotal	61
Unknown	
Isolates	11

Archaeological sites within Special Designation Areas are depicted in Table 3-12. These Special Designation Areas offer enhanced protection for heritage resources (e.g., wilderness and ACECs). Surveying or resurveying all management areas for cultural resources as well as continued monitoring of known sites would occur under Section 110 of the NHPA as funding is available.

**TABLE 3-12
SITES WITHIN SPECIAL DESIGNATION AREAS**

Site Number	Area
IMP-1383, -1384, -1385, -3811, -4764H, -4910, 7158H	Plank Road ACEC
IMP-1150, -1152, -4398, -4635, -4636, -5283, -7158H	North Algodones Dunes Wilderness
P-008620	East Mesa ACEC

3.10.5 Site Significance

The management of cultural resources on BLM land must be in compliance with several federal laws, including the Antiquities Act of 1906; the NHPA of 1966, as amended; the NEPA of 1969; EO 11593—*Protection and Enhancement of the Cultural Environment*; the Federal Land Policy and Management Act of 1976; the American Indian Religious Freedom Act of 1978; the Religious Freedom Restoration Act of 1993; the Archaeological Resource Protection Act of 1979; the Native American Graves Protection and Repatriation Act of 1990; EO 13007—*Indian Sacred Sites*; and EO 13287—*Preserve America*. The NHPA of 1966 requires all federal agencies to take into account the effects of their actions on the nation’s historic properties (Section 106), and directs federal agencies to assume responsibility for the preservation of historic properties that are owned or controlled by such agency (Section 110). Under the NHPA, site significance and eligibility for listing in the NRHP need to be evaluated in terms of a historic context that identifies geographic area, period of significance, historical themes or research questions, and Native American values. The historical context describes significant broad patterns of prehistory or history based on cultural themes and their geographical and chronological context. Site-specific contexts should include the time period of occupation, identification of occupants, and function. Historic themes may include agriculture, transportation, ranching, mining, exploration, and the military. Prehistoric themes may include settlement system, economy, and spirituality. Native American land use areas of concern may include rock art, cremation sites, and traditional cultural areas. Traditional cultural areas include places that represent or imbue the traditions, beliefs, lifeways, arts, crafts, and social institutions of any community, not just Native American communities (Parker and King 1998; Parker 1985). The historical context is sometimes used to generate research questions needed to evaluate individual sites. All sites identified on BLM-administered lands within the Planning Area should be evaluated for eligibility for inclusion in the NRHP because of BLM’s responsibility to preserve historic properties under Section 110 of the NHPA and to take into account effects of their undertakings on historic properties under Section 106

of the NHPA (36 CFR 800). Eligibility for inclusion in the NRHP is based on the following:

The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association; and:

- A) that are associated with events that have made a significant contribution to the road patterns of our history; or
- B) that are associated with the lives of persons significant in our past; or
- C) that embody the distinctive characteristics of a type, period, or method of construction, or representation of the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- D) that have yielded, or may be likely to yield, information important in prehistory or history. (36 CFR 60.4)

A NRHP-eligible site must meet one or more of the above criteria and have integrity appropriate to the criteria. In most cases, prehistoric sites qualify under criterion D; Historic Period properties often qualify for listing under criterion A, B, or C. Integrity varies in terms of the criterion under which the site is evaluated. For example, an archaeological site evaluated under criterion D would need to have the potential to provide meaningful scientific research data. If the site has been disturbed or damaged to the extent it cannot do this, it would lack integrity. Historic buildings, on the other hand, typically need to be in their original location and be relatively unmodified or restorable to have integrity under criterion A, B, or C. Historic buildings and structures must also evoke the historic period of significance to a lay person.

Under special consideration, some heritage resources not otherwise eligible may be considered eligible. These include religious properties, moved properties, birthplaces and graves, cemeteries, reconstructed properties, commemorative properties, and properties less than 50 years old. These special considerations include:

- a) A religious property deriving primary significance from architectural or artistic distinction or historical importance; or
- b) A building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event; or
- c) A birthplace or grave of a historical figure of outstanding importance if there is no appropriate site or building directly associated with his or her productive life; or

- d) A cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events; or
- e) A reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived; or
- f) A property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own exceptional significance; or
- g) A property achieving significance within the past 50 years, if it is of exceptional importance.

Prehistoric and historic resources should be evaluated in order to:

- a) Determine site or structure type, appropriate criteria of eligibility and level of integrity so that an appropriate treatment plan can be developed;
- b) Determine the horizontal and vertical surface extent of each site, as well as information regarding internal variability; and
- c) Determine, which sites are significant and warrant protection and consideration in the planning process.

Until site significance is determined, all prehistoric and historic resources on BLM-administered lands should be managed under the assumption that they are eligible for listing in the NRHP. A preliminary level of significance may be assigned for a site based on surface observations. Confirmed level of significance is assigned, when the appropriate evaluation program, such as surface artifact collection or subsurface testing, has been completed. Evaluation of historic structures and historic archaeological sites typically requires archival research, including a literature review and historic maps (see Parker 1985).

The literature review and record search was based on records available at the El Centro Field Office. This review of existing site records revealed that the vast majority of sites on BLM-administered lands within the Planning Area have not been evaluated for significance (Appendix L). None of the cultural resources within the Planning Area are listed in the NRHP. Twenty-three sites (10 prehistoric, 13 historic) have been recommended as eligible for inclusion in the NRHP. Seventy-six sites (4 prehistoric sites, 16 historic sites, 42 isolates) have been recommended not eligible for inclusion in the NRHP. Of the 42 isolates, 26 are prehistoric isolates, 16 are historic isolates, and 11 are unknown due to missing site forms. Isolates are not considered eligible for listing in the NRHP. Four prehistoric sites and 16 historic sites are not eligible for listing in the NRHP. Sixty sites (2 prehistoric/historic sites, 47 prehistoric sites, 11 historic sites) have not been evaluated. One site, the Plank Road, is a California Historical Landmark, is listed on the California Register of Historical Resources, and has been nominated for

listing in the NRHP. Site forms are missing in 15 cases. It is assumed that these sites have not been evaluated.

3.10.6 Historically Significant Linear Features

Linear features in the Planning Area consist of historic roads, railroad, and canals.

3.10.6.1 Historic Roads

Old Highway 80 (CA-IMP-8356) was one of the earliest transcontinental highways. This two-lane highway was designated as a route in the 1920s and connected San Diego, California, to what is now metropolitan Savannah, Georgia. The segment of Highway 80 that runs through Imperial County was completed in 1926. Parts of Old Highway 80 are NRHP-eligible. After World War II, an interstate freeway system was built that is still used today. Old Highway 80 was replaced in Imperial Valley in 1964. Portions of Old Highway 80 remain; two segments are located within the Planning Area and consist of an asphalt and gravel road in moderately good condition. The segments have been recommended not NRHP-eligible (Apple et al. 2006).

The Yuma to Coachella Road was an 1857 wagon road along the east side of the Southern Pacific Railroad. Water stops along this road were Mammoth Tank, Frink's Spring, the Cienegas, and Dos Palmas (Wray 2004).

A discussion of the historic Plank Road through the ISD will be discussed below in Section 3.10.7.

3.10.6.2 Historic Canals

The All-American Canal (CA-IMP-7130H) was constructed between 1934 and 1940 to transport water from the Colorado River to Imperial Valley. It was part of the Boulder Canyon Act that authorized a noteworthy water reclamation project including the Boulder Dam, Imperial Dam and Desilting Works, the All-American Canal, and the Coachella Branch of the All-American Canal. The All-American Canal is 82 miles long and runs from the Imperial Dam Desilting Works west to the West Side Main Canal. It has been recommended NRHP-eligible under criterion A because of its association with the agricultural development and settlement of the Imperial and Coachella valleys. The areas served by the canal have become one of the richest and most important agricultural areas in the United States since the completion of the canal in 1938 (Queen 1999). The canal has also been recommended NRHP-eligible under criterion C as part of a district. The All-American Canal Project System is a district that is significant for its engineering construction (Schaefer and O'Neill 2001).

The Coachella Canal, including the Old Coachella Canal (CA-IMP-7658), was built between 1935 and 1948 as a branch of the All-American Canal. Its purpose was to deliver water to the northeast portion of Imperial Valley and to the Coachella Valley. The total length of the canal is 122 miles. The Old Coachella Canal is a segment of the Coachella Canal that was abandoned in 1982 when a concrete-lined channel was built adjacent to it. The Old Coachella Canal is the first 49 miles of the canal. The last segment (38 miles) of the canal from North Shore to Lake Cahuilla was lined with concrete to prevent water loss (Schaefer and Ghabhláin 2003).

The Coachella Canal, including the abandoned segment, has been recommended NRHP-eligible under criterion A because of its association with one of the largest and most ambitious water reclamation projects in the United States involving Colorado River water. Other parts of the reclamation project include Boulder Dam, Imperial Dam, and the All-American Canal. This project allowed for major agricultural and population growth for the western states after World War II. In addition, the Coachella Canal was a public works program from the 1920s Progressive Era and represents the federal government's involvement with economic development under the New Deal in the 1930s (Schaefer and O'Neill 1998; Schaefer and Ghabhláin 2003). The Coachella Canal is also NRHP-eligible under criterion C because the design and dimensions of the earth-lined and concrete-lined sections of the canal are typical of canal construction during the 1930s and 1940s. It is recommended significant at a local and regional level, but not at a national level. In addition, Schaefer and Ghabhláin (2003) recommend that the canal is eligible for listing in the NRHP as part of a district with the Imperial Dam and Desilting Works, the All-American Canal, and the Coachella Canal.

3.10.6.3 Historic Railroad

The segment of Southern Pacific Railroad (now UPRR; CA-IMP-3424H/CA-RIV-6381H) that runs through the Planning Area was constructed in the 1870s. The Southern Pacific Railroad stretches from El Paso, Texas, to San Francisco, California. Mainline sites or stops along the railroad from northwest to southeast (within the Planning Area) included Tortuga, Amos (also known as Mammoth), Acolita, Mesquite, Glamis, Ruthven, Drylyn/Clyde, Cactus (late), Cactus (early), Ogilby, and Pilot Knob (Wray 2004). Amos had its own post office in 1920 and an associated historic cemetery from the railroad construction period still exists. Glamis had a store and school for railroad workers. It also has an associated historic cemetery from the railroad construction period. Glamis has experienced an economic resurgence as a result of the popularity of the ISD as a recreation area. It has a year-round store/recreational vehicle (RV) storage and services, and numerous temporary vendors during the winter recreation season. Acolita had a large concrete cistern for water brought in by railcar. Ogilby is the junction for a road to the Cargo Muchacho Mountains mining areas to the northeast. The railroad access at Ogilby was heavily used in the 1880s and 1890s by the town of Hedges and the American Girl Mine at Obregon. A store and school remained until 1940. Foundations

and a cemetery still exist (Wray 2004). A few of the old structures and the water tank remain standing at Pilot Knob.

The Ogilby Station (CA-IMP-8191H) was established in 1877 as a railroad stop equipped to supply water to for the steam-powered engines. Archival research and oral history was conducted as part of the mitigation for the North Baja Pipeline project (Cleland et al. 2003). The town of Ogilby was located north and south of the railroad tracks and served the Tumco–Hedges mining district. By 1880, Ogilby had its first post office, which closed after four months, reopened in 1890, and discontinued again in 1895. The final post office closed in 1942. A school was established in the 1920s and closed in 1946. The town of Ogilby was abandoned in the 1950s and the remaining buildings were demolished, leaving the cemetery behind. The archaeological remains have been recommended eligible for listing in the NRHP. A fabrication plant in Ogilby produced the planks for the second historic Plank Road in 1916. Three 1-by-1-meter units were excavated in order to investigate two features which were discovered during construction monitoring for the North Baja Pipeline project. The majority of recovered artifacts consisted of glass. Other artifact types included metal, brick, buttons, historic ceramics, rubber, charcoal, and bone fragments (Cleland et al. 2003).

3.10.7 California Historic Landmarks

The California Historic Landmark program is designed to recognize places of California heritage significance with stone monuments and bronze plaques along roadways. Most of the commemorative monuments are actually located on California Department of Transportation (CALTRANS) or county road ROWs, even those within BLM-administered lands. California Historic Landmarks are buildings or sites that have been approved for designation by the local county board of supervisors or city council and recommended by the State Historical Resources Commission.

To be eligible for designation as a Historic Landmark, a property must be:

- The first, last, only, or most significant of its type in the state or within a large geographic region (northern, central, or southern California)
- Associated with an individual or group having a profound influence on the history of California
- A prototype of, or an outstanding example of, a period, style, architectural movement or construction or is one of the more notable works or the best surviving work in a region of a pioneer architect, designer or master builder

The only listed California Historic Landmark is within the Planning Area is the historic Plank Road (CA-IMP-4764H) traversing the ISD. It is located at the southern end of the Planning Area.

The Plank Road (California Historical Landmark No. 845) was constructed by the California Highway Commission in 1916 to provide vehicle access across the dunes. Prior to this access across the Planning Area, travelers headed south into Mexico or north through Mammoth Wash to go around the Algodones Dunes. The Plank Road was 7 miles long and constructed of wooden cross-ties, which replaced an earlier road of parallel planks laid down in 1915 (PHR Associates and Carrico 1989). The method of construction was an experiment previously untried. The engineering techniques used were unusual (National Register Form). The Plank Road was abandoned in 1926 when it was replaced by Highway 80, which was in turn later replaced by I-8. Only segments of the Plank Road remain today. Two of the segments contain wood planks lashed with metal straps and tarred and three segments have only the tarring. In addition to being listed as a California Landmark, Plank Road is recommended eligible for listing in the NRHP under criteria A and C (California Department of Parks and Recreation 2009). Plank Road is associated with opening a more direct southern travel route and with the competition between Los Angeles and San Diego for the Pacific Coast terminus of a transcontinental highway. The opening of the travel route eased access to shipping for valley farmers and contributed to the agricultural growth of the Imperial Valley.

3.11 Paleontological Resources

Paleontological resources are the fossilized evidence of past life found in the geologic record. Despite the tremendous volume of sedimentary rock deposits preserved worldwide and the enormous number of organisms that have lived through time, preservation of plant and animal remains as fossils is an extremely rare occurrence. Because of the infrequency of fossil preservation, fossils—particularly vertebrate fossils—are considered to be nonrenewable resources. Because of their rarity and the scientific information they can provide, fossils are highly significant records of ancient life. They can provide information about the interrelationships of living organisms, their ancestry, development, and change through time, and their former distribution. Progressive morphologic changes observed in fossil lineages may provide critical information on the evolutionary process itself—that is, the ways in which new species arise and adapt to changing environmental circumstances. Fossils can also serve as important guides to the ages of the rocks and sediments in which they are contained and may prove useful in determining the temporal relationships of rock deposits from one area to another and the timing of geologic events. Time scales established by fossils provide chronologic frameworks for geologic studies of all kinds.

Significant fossils include all vertebrate fossil remains (body and trace fossils) and plant and invertebrate fossils determined to be scientifically unique. Paleontological resources (fossils) include the bones, teeth, body remains, traces, or imprints of plants and animals preserved in the earth since a past geologic time. All fossils offer scientific information, but not all fossils offer significant scientific information. Among paleontologists, fossils

generally are considered scientifically significant if they are unique, unusual, rare, diagnostically or stratigraphically important, or add to the existing body of knowledge in a specific area of science. Most fossils occur in sedimentary rock formations. Although experienced paleontologists generally can predict which formations will contain fossils and what types of fossils will be found based on the age of the formation and its depositional environment, predicting the exact location where fossils will be found without field surveys is usually not possible.

The BLM uses the Potential Fossil Yield Classification (PFYC) System to classify geologic units based on their relative abundance in vertebrate fossils or scientifically significant invertebrate or plant fossils and their sensitivity to adverse impacts, with a higher class number indicating potential. These classes are as follows:

Class 1 (very low). Geologic units likely to contain recognizable fossil remains. Management concern is negligible, and assessment or mitigation requirements are usually not necessary, with the exception of isolated circumstances.

Class 2 (low). Sedimentary geologic units not likely to contain vertebrate fossils or significant non-vertebrate fossils. Management concern is generally low, and assessment of mitigation is usually not necessary, with the exception of isolated circumstances.

Class 3 (moderate or unknown). Fossiliferous sedimentary geologic units where fossil content varies in significance, abundance and predictable occurrence, or units of unknown fossil potential. Management concern is moderate or cannot be determined from existing data. Ground-disturbing activities may require field assessment to determine the appropriate course of action.

Class 4 (high). Geologic units containing a high occurrence of significant fossils. The probability for impacting significant paleontological resources is moderate to high, and is dependent on the proposed action. Anticipated impacts to significant fossils would usually require a field survey, followed by on-site paleontological monitoring or spot-checking.

Class 5 (very high). Fossil-rich geologic units that regularly produce vertebrate fossils or significant non-vertebrate fossils that are at risk of natural degradation or human-caused adverse impacts. The probability of impacting significant fossils is high, and fossils are known or can reasonably be expected to occur in the impacted area. Anticipated impacts to significant fossils would usually require a field survey, followed by on-site paleontological monitoring or spot-checking.

All land within the Planning Area is classified under PFYC Class 2 (P. Hester, pers. comm. 2009). Since the dunes are unconsolidated sand, they are not likely to contain fossil resources. A search of the University of California Museum of Paleontology

database indicated no fossil resources to have been documented within the Planning Area.

While the PFYC is based on probabilities, not certainties or known locations, there will be exceptions to each classification based on the criterion used as the basis. Where the presence or absence of vertebrate and significant invertebrate fossils are not known in a geologic unit, existing protocols allow for inventory, assessments, and mitigation of potential paleontological resource impacts on a case-by-case basis.

In general, the collection and preservation of fossils found on public lands are authorized under the Paleontological Resources Preservation Act and using existing policies and guidelines as detailed in BLM Manual 8270 and Handbook H-8720-1 until such time that final regulations are promulgated and the manual and handbook are revised. Common invertebrate and plant paleontological resources are available for non-commercial hobby collecting without a permit (16 USC 470aaa). Paleontological resource use permits are required for the collection of significant fossils. All vertebrate fossils and, in rare cases, invertebrate or plant fossils of paleontological interest are deemed significant under current policy.

3.12 Visual Resources

The BLM is responsible for ensuring that the scenic values of public lands are considered before allowing uses that may have negative visual impacts. The BLM accomplishes this through its VRM system, a system which involves inventorying scenic values and establishing management objectives for those values through the resource management planning process, and then evaluating proposed activities to determine whether they conform to the management objectives.

Visual resources include a variety of landscapes and forms which contribute to high-quality recreation experiences. Visual variety at the Planning Area 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 Planning Area its distinctive landscape character.

3.12.1 Regulatory Framework

The FLPMA of 1976 requires BLM to protect the quality of scenic values on public lands (43 USC 1701). To achieve that goal, BLM has developed and uses an analytical process that identifies, sets, and meets objectives for maintaining scenic values and

visual quality—the VRM System. This standard protocol is used for the inventory and analysis of visual resource values. The VRM system functions in two ways: first, in the inventory of visual resources and second, in their management (BLM 1984a).

The inventory stage involves identifying the visual resources of a given land area and assigning an inventory class to it. The inventory process involves rating the visual appeal of a tract of land, measuring public concern for its scenic quality, and determining whether the tract of land is visible from travel routes or observation points. The process is described in detail in BLM Manual H-8410-1—*Visual Resource Inventory* (1984b). Class I is assigned to wilderness and WSAs, where the current management situation requires maintaining a natural environment essentially unaltered by human actions, even where exceptional scenic values are not exhibited.

Based on three factors—scenic quality, sensitivity, and visibility/distance zones—all other BLM-administered lands are assigned one of four visual resource inventory classes (Table 3-13). These inventory classes represent the relative value of visual resources, classes I and II being the most valued, Class III representing a moderate value, and Class IV being of least scenic value.

**TABLE 3-13
VISUAL RESOURCE INVENTORY CLASSIFICATION MATRIX**

Special Areas		Visual Sensitivity Level						
		High			Medium			Low
		I	I	I	I	I	I	I
Scenic Quality	A	II	II	II	II	II	II	II
	B	II	III	III*	III	IV	IV	IV
				IV*				
	C	III	IV	IV	IV	IV	IV	IV
		f/m	b	s/s	f/m	b	s/s	s/s
	Distance Zones							

Source: BLM Manual H-8410-1

Key to Distance Zones:

f/m=foreground/middleground

b=background

s/s=seldom seen

* If adjacent areas are Class III or lower, assign Class III; if higher, assign Class IV.

The visual resource inventory results in the Visual Resource Inventory Classification, which provides the basis for considering visual values in the BLM's planning process. It is the RAMP development process that assigns the management classes.

These management classes describe the Visual Management objectives of a given area, ranging from preservation to major modification, as well as the different degrees of modification to the basic elements of the landscape (form, line, color, texture) that are allowed.

The BLM-established management objectives for each VRM class are shown in Table 3-14.

**TABLE 3-14
VISUAL RESOURCE MANAGEMENT OBJECTIVES BY CLASS**

Visual Resource Class	Visual Management Objective
Class I	The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
Class II	The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
Class III	The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
Class IV	The objective of this class is to provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

Source: BLM Manual H-8410-1

During the RAMP process, the inventory class assignments and/or boundaries may be adjusted as necessary to reflect the resource allocation and management decisions made in the RAMP. Under different RAMP alternatives, VRM Classifications may vary according to the underlying alternative resource management priorities and strategies. Alternative visual management scenarios are discussed further in Section 2.3.12.

3.12.2 Existing Visual Resource Management

The BLM completed preliminary visual resource inventories while preparing the Draft CDCA Plan between 1976 and 1980. The final CDCA Plan, published in 1980 and which includes the ISD, did not include visual resources as one of the plan elements and did not assign VRM classes. Visual resources are included in the Recreation Element, but no VRM classes are identified. The Planning Area was not inventoried for visual resource values when preparing the current ISD RAMP. The 1980 CDCA Plan utilized

MUC to manage visual resources. The 1987 ISD RAMP contains VRM Class designations in the Environmental Assessment, but no analysis of impacts to visual resources from the plan alternatives. No visual resource inventory was conducted and no maps or acres of the VRM classes were specifically identified. The description of the VRM classes are included on page EA-32 of the ISD RAMP Environmental Assessment as follows, "Class II: All dune areas are included in this class, which covers the majority of the recreation area; Class III: This class includes the Boardmanville area south of Highway 78 and east of the railroad tracks and East Mesa immediately south of Highway 78 and west of the Gecko Camping area; Class IV: This class comprises the remaining portion of East Mesa within the recreation area." The approximate acreages of these VRM classes are: VRM Class II - 145,771 acres; VRM Class III – 29,580 acres; and VRM Class IV – 3,200 acres.

A new VRM inventory was completed in January of 2009 as part of preparing for the Draft RAMP/Draft EIS. Results of this inventory are presented in Section 3.12.4 below. An additional visual resource inventory was conducted throughout the CDCA in 2010, including the El Centro Field Office, as part of the Programmatic EIS for Solar Energy Development in Six Southwestern States (Solar PEIS). The visual resource inventory for the Solar PEIS is more general and covers a larger planning area than the visual resource inventory for the ISD RAMP, which is more focused on the ISD. Although the visual resource inventory for the Solar PEIS overlaps the ISD RAMP Planning Area, and although the Solar PEIS and the ISD RAMP are on parallel timelines, the BLM has determined that the inventory and analysis prepared for the Draft RAMP/Draft EIS will be used and it has been carried over for this proposed plan. The Solar PEIS and the ISD RAMP/EIS may be released within weeks of each other, but any discrepancies between the VRM Classes in the two plans will be addressed in the ROD for each plan.

3.12.3 Visual Resources of the Planning Area

The following description of the visual resources of the landscape at various areas within the Planning Area is based on informal site visits conducted by BLM resource personnel on October 16 and 17, 2001. The climatic conditions during the site visits included cloudy skies, no wind, and temperatures estimated to be in the 90°F range. The Planning Area 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-dos." They add texture to the visual landscape, as do the vehicle tire tracks on the dunes.

Development within the Planning Area includes the Cahuilla Ranger Station, the Buttercup Ranger Station, the vendor areas, the Glamis Beach Store, and the

development at certain campgrounds (including kiosks and bathrooms). Other human-made development is concentrated at or near the boundaries of the Planning Area boundary. This includes: the UPRR tracks and aboveground pipeline markers that exist along the eastern boundary of the SRMA; overhead electric distribution lines; New Coachella Canal that exists along the western edge; SR-78, which is a major two-lane road that crosses the Planning Area at the southern edge of the North Algodones Dunes Wilderness; I-8, a major four-lane interstate highway that crosses the Planning Area near the southern edge; All-American Canal, which parallels the north side of I-8; high-voltage electric transmission line development, which also parallels I-8; and a communications tower, which is located near the Ogilby Camp Area. This development near the Planning Area boundary reflects the character of an urban developed area.

The ISD SRMA is open year-round; however, due to high summer temperatures, the highest 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, New Year's Eve and Day, Martin Luther King Day, Presidents' Day, and Easter.

Although OHV recreation occurs throughout the open areas of the Planning Area, certain areas receive higher levels of use, such as Osborne Overlook, Competition Hill, Oldsmobile Hill, Brawley Slide Hill, Patton Valley, Test Hill, and Plank Road. During the 2001 site visits, 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 heavy use that occurs at these areas at peak times reflects the BLM's VRM Class IV management of these areas.

Mammoth Wash, at the northern end of the Planning Area, receives minimal use due to its remoteness. This area has dunes that are smaller than those occurring further south, so less OHV recreation opportunity exists there. This northern area has private land interspersed with BLM land. Grapefruit orchards abut the dunes adding color, texture, line, and form variety to the dune landscape.

Camping by OHV recreationists is concentrated at the Gecko Campground, Keyhole Campground, Roadrunner Campground, the Washes, Ogilby Camp Area, Buttercup Campground, Midway Campground Dune Buggy Flats Campground, and Grays Well 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 was visible. These areas also appeared relatively pristine, except for the restroom and trash facilities and the signage that exists at certain areas. However, photographs taken during peak-use weekends show the camping areas crowded by recreational vehicles, OHVs, camping equipment, and recreationists, which together result in a strong visual contrast to what was seen during the site visits. Site

visits during peak-use weekends and review of these photographs provide a more accurate characterization of the intensive use that occurs within these VRM Class IV areas.

The Cahuilla Ranger Station, located just south of SR-78 on Gecko Road, consists of a ranger station, small medical trailer, garage, and a fenced equipment/vehicle storage yard. There is also a vendor concessionaire area on Gecko Road, which was mostly vacant at the time of the site visits. The presence of vendors in this area during the peak-use times of the year reflects a developed character that strongly contrasts with the natural, undeveloped character of the dunes.

Osborne Overlook 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 western end, and day use viewing is allowed at the eastern end. Views to the east from the overlook are of rolling dunes in the foreground/midground (i.e., within 3 to 5 miles) and of the Black Mountains in the background. To the north are 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 Wildlife Viewing Area, near the North Algodones Dunes Wilderness, includes explanatory wildlife and habitat information on interpretive boards. Motorized vehicle use is not allowed or evident beyond the viewing area within the wilderness.

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. A small area has been constructed to showcase a replica of the Plank Road, demonstrating to the public how the historic road once appeared. Interpretive information is also displayed at the partially fenced Plank Road area.

Several types of USBP barriers exist along I-8 on its south side to the west of the Buttercup Campground. The purpose of these barriers is to prohibit vehicles from entering the United States from Mexico. A braced, steel beam border fence was constructed along a large portion of the dunes along the border in 2008. Other barriers consist of steel vehicle barricades painted white with red accents. The form, color, and line of these barriers contrast with the dunes and desert landscape; however, this area is also a utility corridor that includes several high-voltage electric towers of varying designs.

The Mesquite Mine (east of the UPRR tracks, at the base of the Chocolate Mountains) is located east of the Planning Area. 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, mining area, and tailings. To the southwest, there is an unobstructed view of Oldsmobile Hill.

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. The dunes are visible to the west.

3.12.4 VRM Inventory—Scenic Quality Rating Units

The visual resource inventory process performed for this DRAMP included site visits to assess scenic quality, a qualitative evaluation of visual sensitivity, identification of KOPs, identification of cultural modifications in the landscape, and an evaluation of the effects of those modifications on character and quality. The trend in the scenic quality of the Planning Area is relatively stable and this can be ascribed to the amount of sandy terrain throughout the Planning Area, which—coupled with lack of water—has constrained and limited development. However, OHV recreation has been increasing, and the resulting effects can be seen and are expected to continue to increase.

The visual inventory process resulted in the identification, mapping, and evaluation of eight separate Scenic Quality Rating Units (SQRUs) named as follows:

- Large dunes
- Small dunes
- Microphyll woodlands
- Dissected creosote
- Creosote scrub
- High-use areas
- Interstate 8 corridor
- Agricultural area

These SQRUs were delineated based on homogeneity of the landscape features and character; similar visual patterns, form, line, color, texture, and variety; and extent of impacts from human modifications. A Scenic Quality Field Inventory form and Visual Resource Inventory Classification matrix were completed for each of the SQRUs and are included in Appendix M. A high visual sensitivity ranking was assigned to the large dunes, small dunes, and microphyll woodlands, where public expectation for naturalness and scenic quality are highest. A medium visual sensitivity ranking was assigned to the other SQRUs, in which there is generally a somewhat lower expectation for scenic quality and/or a relatively higher tolerance for evidence of impact and human development.

For the purposes of this Visual Inventory effort, it was assumed that KOPs include the roadways within and adjacent to the Planning Area, as well as the BLM-designated places of interest and observation points (e.g., Osborne Overlook, Watchable Wildlife site, Plank Road site). For this reason, the entire Planning Area is considered to be within the foreground/midground of one or more KOPs.

The SQRUs are shown on Map 3-5 and briefly described in the following subsections.

3.12.4.1 SQRU 1—Large Dunes

The large dunes are the core of an internationally significant scenic landscape. From the interior of these dunes, foreground/midground views in all directions are of the surrounding dunes that are smooth, rounded hills of fine-textured, light-colored sand. Background views include the distant mountainous terrain to the northeast, east, and southeast, as well as the relatively flat agricultural plane to the west. The rugged sandy terrain restricts use primarily to OHVs (including sand rails and four-wheel-drive vehicles). The majority of the large dunes area contains little or no vegetation and provides little variety in views, but this area presents an interesting landscape that is enhanced by the stark contrast of the dunes against the blue 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 the patterns caused by OHV recreation. The closed areas and the North Algodones Dunes Wilderness (north of SR-78) appear pristine, with no vehicle tracks visible. The majority of the large dunes have a low level of surface disturbance.

Scenic quality for this unit is rated high (A). The visual sensitivity level of this unit is high due to its recreational use and designation and associated public interest, expectation, and concern for high scenic quality. This SQRU is within foreground/midground views of dune recreationists, sight-seers and viewers on adjacent roads (e.g., Sand Road, SR-78 and I-8), campers, and from aircraft flights heading east to or west from the San Diego area. A portion is designated as the North Algodones Dunes Wilderness (north of SR-78), for which special consideration is given for the protection of visual values. The Visual Inventory Classes are Class I (wilderness) and Class II (Map 3-6).

3.12.4.2 SQRU 2—Small Dunes

The small dunes are located on the outer edges of the large dunes. These smaller dunes rise gently from the relatively flat adjacent creosote plains, resulting in a scenic landscape element that provides a visual buffer to the large dunes. The rugged and colorful Chocolate, Cargo Muchacho, and other mountains to the east contrast sharply in form and color, adding visual interest to the area. The higher, larger dunes provide topographic contrast, also adding visual interest to this unit. Valleys and dune bases

contain sparse vegetation; little or no vegetation is found on the small dunes. Microphyll woodlands are located adjacent to the small dunes (meandering between dunes in places) along the eastern portion of the Planning Area, providing additional visual interest. As with the large dunes, the tan color of the dune sand is generally monochromatic, but there are variations in light and shadow throughout the day and brilliant colors at sunrise and sunset. Although evidence of surface disturbance is relatively low on the small dunes, many areas of creosote plains adjacent to the small dunes show high levels of recreational use (primarily OHV and camping).

Scenic quality for this unit is rated high (A). The visual sensitivity level of this unit is relatively high due to its recreational use and adjacency to the large dunes. This area is within foreground/midground views of dune recreationists, viewers on adjacent roads (Ted Kipf Road and Wash Road, for example), campers, and from aircraft flights heading east to or west from the San Diego area. A portion is designated as the North Algodones Dunes Wilderness (north of SR-78), for which special consideration is given for the protection of visual values. The Visual Inventory Classes are Class I (wilderness) and Class II (Map 3-6).

3.12.4.3 SQRU 3—Microphyll Woodland

The microphyll woodlands are fingers of higher density vegetation that dissect the relatively sparse creosote plains adjacent to the small dunes on the eastern side of the Planning Area. The woodlands are primarily along washes flowing west from mountains to the east into the small dunes. Increased water availability from storm events and increased soil moisture result in more densely vegetated linear corridors along the washes. The abundance and type of vegetation present in this unit is not characteristic of much of the Planning Area. This unit exhibits color and texture that is not seen in other portions of the Planning Area. The denser vegetation and darker green colors of the microphyll woodlands contrast sharply with the small dunes and add visual interest to the creosote plains. The microphyll woodlands are relatively rare and provide important wildlife habitat not found elsewhere within the Planning Area.

Scenic quality for this unit is rated high (A). The visual sensitivity level of this area is high due to the unique density and diversity of vegetation. This area is within foreground/midground views of dune recreationists, viewers on adjacent roads (Ted Kipf Road and Wash Road), campers, and from aircraft flights heading east to or west from the San Diego area. A portion is designated as the North Algodones Dunes Wilderness (north of SR-78), for which special consideration is given for the protection of visual values. The Visual Inventory Classes are Class I (wilderness) and Class II (Map 3-6).

3.12.4.4 SQRU 4—Dissected Creosote

The dissected creosote SQRU is located primarily along the eastern side of the dunes within the Planning Area. This unit consists of a gently sloping plain with a very sparse distribution of creosote. The unit is dissected by washes conveying storm flows from the Chocolate and Cargo Muchacho mountains to the dunes. Increased soil moisture results in “fingers” of high density and higher diversity vegetation (much more diversity of structure and forms) within washes (microphyll woodlands described above).

Scenic quality for this unit is rated medium (B). Visual sensitivity is medium. Many areas within this unit have high visitor use from OHV recreationists camping and riding to the adjacent dunes, particularly during holidays and key weekends. This unit contains few special areas, but is located adjacent to several special management areas such as the North Algodones Dunes Wilderness and those within the larger dunes. This area is within foreground/midground views of dune recreationists, campers, adjacent roadways, and from aircraft flights heading east to and west from the San Diego area. A portion is designated as the North Algodones Dunes Wilderness (north of SR-78), for which special consideration is given for the protection of visual values. The Visual Inventory Classes are Class I (wilderness) and Class III (Map 3-6).

3.12.4.5 SQRU 5—Creosote Flats

The creosote flats SQRU is located primarily along the western side of the dunes within the Planning Area. This unit consists of a gently sloping plain with a relatively even and low-to-moderate density and distribution of creosote, with few, if any, washes dissecting the plain. This unit is mostly lacking in trees and ocotillo. The unit is crossed by the New Coachella Canal and canal roadway. Few structures are present overall.

Scenic quality for this unit is rated medium (B). Visual sensitivity is medium. Many areas of this unit have high visitor use from OHV recreationists camping and riding to the adjacent dunes, particularly during holidays and key weekends. This unit contains few special areas, but is located adjacent to the dunes special management area. This area is within foreground/midground views of dune recreationists, campers, adjacent roadways, and from aircraft flights heading east to and west from the San Diego area. A portion is designated as the North Algodones Dunes Wilderness (north of SR-78), for which special consideration is given for the protection of visual values. The Visual Inventory Classes are Class I (wilderness) and Class III (Map 3-6).

3.12.4.6 SQRU 6—High-use Areas

Areas receiving the highest visitor use were identified as a separate SQRU. These high-use areas are located along roadways within the Planning Area (south of SR-78, Ted Kipf Road, and Ogilby Road), mostly in relatively flat terrain—either within the dunes or

creosote scrub plains. High-use areas consist primarily of campgrounds and vendor areas. The majority of campers concentrate within these high-use areas, particularly during holidays and key weekends, when thousands of visitors recreate in the dunes. Cultural modification of the high-use areas consists of roadways (some paved), bathroom facilities, level parking areas, signs and kiosks, and vendor areas. The Cahuilla Ranger Station is located off Gecko Road near several high-use campgrounds. Modifications to the landscape generally contrast with the undeveloped/naturalistic high scenic quality of the surrounding dunes.

Scenic quality for this unit is rated low (C). Visual sensitivity is medium. These areas have high visitor use from OHV recreationists camping and riding to the adjacent dunes, as well as vendors. Visitor use is highest during holidays and key weekends. The high-use areas are located either within the dunes (campgrounds off of Gecko Road) or adjacent to the dunes. High-use areas are within foreground/midground views of dune recreationists (OHV riders), adjacent roadways, and from aircraft flights heading east to and west from the San Diego area. The Visual Inventory Class is Class IV (see Map 3-6).

3.12.4.7 SQRU 7—Interstate 8 Corridor

The I-8 corridor was identified as a separate SQRU. It is a very high-use area containing a split 4-lane highway, frontage roads, above- and belowground utility lines, a rest area, and portions of the All-American Canal. There are also several campgrounds within or adjacent to the corridor and the Buttercup Ranger Station (south of I-8 near the Grays Well Road exit). Vegetation within the corridor is minimal, consisting primarily of creosote scrub. The dunes are visible from the corridor, adding visual interest. The recently completed U.S.–Mexico border fence (consisting of approximately 15-foot-high steel fencing) is highly visible along some portions of the corridor. During high-use periods, hundreds of recreational vehicles (campers and OHVs) may be seen adjacent to the corridor.

Scenic quality for this unit is rated low (C). Visual sensitivity is medium. These areas have high visitor use from OHV recreationists camping and riding to the adjacent dunes, as well as vendors. Visitor use is highest during holidays and key weekends. The corridor has relatively high volumes of interstate traffic and contains several above- and belowground utility lines. High-use areas are within foreground/midground views of dune recreationists (OHV riders), adjacent roadways, and from aircraft flights heading east to and west from the San Diego area. The Visual Inventory Class is Class IV (see Map 3-6).

3.12.4.8 SQRU 8—Agricultural Area

An agricultural area located within the Planning Area was identified as a separate SQRU. The agricultural area located in the northern portion of the Planning Area consists primarily of orchard trees. Trees are evenly spaced within blocks, with access roads between and surrounding orchard blocks. Blocks seem to be arranged at an angle to the dunes located to the east. The dark green of tree canopies contrasts strongly with the light tans of the dunes. A large wash (Mammoth Wash) dissects the central portion of the orchard blocks from northeast to southwest. The Coachella Canal dissects the orchards from south to north. Modifications to the landscape generally contrast with the high scenic quality of the adjacent dunes.

Scenic quality for this unit is rated low (C). Visual sensitivity is medium. The agricultural area has a very high level of cultural modification (planting of orchard trees, ongoing maintenance and harvesting, existence of roads). Recreationists camp and ride OHVs east of the agricultural fields; however, use is lighter in this area as opposed to areas south of SR-78. The agricultural area unit is within foreground/midground views of campers, dune recreationists (OHV riders), adjacent roadways, and from aircraft flights heading east to and west from the San Diego area. The Visual Inventory Class is Class IV (see Map 3.6).

3.12.5 Summary of Visual Inventory Classification

A summary of the inventory information is shown in Table 3-15 below. Information in the table includes the size (in acres); ratings assigned for Scenic Quality, Visual Sensitivity, Distance Zone; and the resulting Visual Inventory Class for each SQRU. Approximately 119,440 acres are identified as Scenic Quality A, 81,725 acres as Scenic Quality B, and 13,700 as Scenic Quality C.

**TABLE 3-15
VISUAL RESOURCE INVENTORY SUMMARY**

Scenic Quality Rating Unit	Inventory Area	Scenic Quality Rating Unit	Acres*	Scenic Quality A, B, C	Sensitivity H M L	Distance Zones F M B	Inventory** Class
Large Dunes	Central portion of Planning Area running entire length from north to south	SQRU-1	72,600	A	H	F-M	I & II
Small Dunes	Outside edge of large dunes	SQRU-2	24,890	A	H	F-M	I & II
Microphyll Woodlands	Eastern portion of Planning Area, adjacent to small dunes	SQRU-3	21,950	A	H	F-M	I & II
Dissected Creosote	Eastern portion of the Planning Area	SQRU-4	40,875	B	M	F-M	I & III
Creosote Flats	Primarily within the western portion of the Planning Area	SQRU-5	40,850	B	M	F-M	I & III
High-use Areas	Off of roadways such as Gecko Road, SR 78, and Ogilby Road	SQRU-6	9,210	C	M	F-M	IV
Interstate 8 Corridor	Highway and utility line corridor in southern portion of the Planning Area	SQRU-7	4,065	C	M	F-M	IV
Agricultural Area	Located adjacent to the dunes in the northwestern portion of the Planning Area	SQRU-8	425	C	M	F-M	IV

*Note: Acreages are rounded. Errors may exist due to rounding and GIS data.

**Note: Management Class assignments may vary from Inventory Class. Wilderness and WSAs are assigned Inventory Class I and managed by Class I objectives by national BLM policy (BLM 2000) regardless of scenic value, because the objective is to manage these areas to maintain their natural-appearing landscape.

3.13 Special Designations and Lands with Wilderness Characteristics

Existing special designations within the Planning Area include wilderness and three ACECs. Map 3-7 shows the Special Designations in the Planning Area.

3.13.1 Wilderness

The BLM manages the congressionally designated wilderness within the Planning Area consistent with the Wilderness Act of 1964, the CDPA of 1994, the administrative instruments (e.g., regulations, policies) from that statute, and other applicable federal statutes. These instruments identified management direction for these lands with respect to specific uses that may occur within wilderness, as well as overall goals for lands designated. Of particular importance is the clear Congressional intent that wilderness designations not lead to the creation of “buffer zones” around wilderness boundaries. In and of themselves, non-wilderness activities visible or audible from wilderness are not to be precluded up to such boundaries.

Travel in wilderness is limited to foot or equestrian conveyance. Motorized vehicles, bicycles, or any other forms of mechanized equipment are prohibited in these areas to protect the solitude and primitive nature of these special places.

3.13.1.1 North Algodones Dunes Wilderness

The North Algodones Dunes Wilderness was designated through the California Desert Protection Act of 1994. The North Algodones Dunes Wilderness extends from the east side of the Coachella Canal to Niland/Glamis Road, and north of SR-78 to the Mammoth Wash open area. The wilderness is divided into two distinct zones: the primary dunes on the west, and the secondary dunes on the east. The secondary dunes contain basins or flats which support a variety of vegetation and wildlife due to ephemeral flows. The flat-tailed horned lizard, the Mojave population of desert tortoise, and Colorado Desert fringe-toed lizard are known to occur, as well as the Andrews dune scarab beetle (BLM 1990). Mule deer are known to use the microphyll woodlands associated with washes as corridors through the North Algodones Dunes Wilderness. It is thought that the Yuma puma has followed the deer into the woodland to prey on the mule deer.

The wilderness is closed to motorized vehicle, including OHVs and other mechanized use, with hiking and horseback access permitted. Primitive camping is allowed, but developed camping sites or facilities are not available. 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. BLM also conducts guided hikes into the North Algodones Dunes Wilderness for the local community and school field trips as

staffing allows. Solitude and primitive recreation are the primary land uses within the wilderness.

Wilderness Values

- **Naturalness.** Essentially untrammled by humans, the sole signs of human activity within the wilderness are five wildlife guzzlers. These guzzlers have been concealed as to be unnoticeable within the area as a whole.
- **Solitude.** Opportunities for solitude may be enhanced by the challenge of hiking into the dunes (which may limit use) as well as the natural formations and vegetative cover within the dunes, which has the potential to shield recreationists' line of sight.
- **Primitive Recreation.** Primitive recreation opportunities within the wilderness include hiking, backpacking, and nature study trips.

3.13.2 Lands with Wilderness Characteristics

Lands outside of designated wilderness or WSAs are inventoried during the land use planning process to determine if they possess wilderness characteristics. To be classified as lands with wilderness characteristics, they must possess sufficient size, naturalness, and outstanding opportunities for either solitude or primitive and unconfined recreation. BLM may identify one or more alternatives that will protect identified lands with wilderness characteristics unless BLM determines that impairment of wilderness characteristics is appropriate and consistent with applicable requirements of law and other resource management considerations (See also BLM *Land Use Planning Handbook*, H 1601 1, Appendix C, subparagraph K, Wilderness Characteristics; see also BLM IM 2011-154).

3.13.2.1 Previous Wilderness Inventories

Section 603 of FLPMA directed the Secretary of the Interior and the BLM to review roadless areas of 5,000 acres or more and roadless islands of the public lands having wilderness characteristics and by 1991 to recommend to the President the suitability of such areas for preservation as wilderness. In determining these wilderness values, the law directed the BLM to use the criteria given by Congress in the Wilderness Act of 1964. In Section 2(c) of the Act, Congress states that wilderness is an area of undeveloped federal land in a natural condition, without permanent improvements or human habitation, which has outstanding opportunities for solitude or a primitive and unconfined type of recreation. The area may contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

To accomplish the mandate of Section 603 of FLPMA, the BLM developed a wilderness review process containing three phases: inventory, study, and reporting. The inventory

phase of this process, initiated in 1978, involved examining the public lands to determine and locate the existence of areas containing wilderness characteristics that met the criteria established in the Wilderness Act. Areas clearly lacking wilderness characteristics were sorted out from lands that might have those characteristics. This intensive inventory was then followed by a 90-day public review period, after which final WSAs were identified. This inventory process and a general description of all of WSAs in the CDCA are given in *California Desert Conservation Area Wilderness Inventory* (1979) and the ROD for wilderness recommendations in the *California Statewide Wilderness Study Report* (1991). The inventory included the lands within the ISD Planning Area and recommended the North Algodones Dunes WSA as suitable for inclusion in the National Wilderness Preservation System. The South Algodones Dunes WSA was recommended to be released from wilderness study for uses other than wilderness. It was recommended non-suitable for the following reasons: (1) the long tradition of motor vehicle use; (2) the projected continued high demand for sand dune-oriented off-highway use; (3) the WSA's potential for energy and mineral development; and (4) the similarity of the area to a nearby WSA recommended for wilderness.

Both North and South Algodones Dunes WSAs were held in WSA status and managed under the BLM's Interim Management Policy and Guidelines for Lands under Wilderness Review (DOI, December 1979, as amended 1983) until Congress would designate the areas as wilderness or release the lands from WSA status. In 1994, the CDPA designated the North Algodones Dunes WSA as wilderness and determined that the South Algodones Dunes WSA had been adequately studied and was no longer subject to the requirement of Section 603(c) of FLPMA pertaining to the management of WSAs in a manner that does not impair the suitability of such areas for preservation as wilderness.

3.13.2.2 Inventory Process and Criteria for Lands with Wilderness Characteristics

Although the wilderness review process pertaining to Section 603 of FLPMA has been completed, Sections 201 and 202 of FLPMA direct the BLM to prepare and maintain on a continuing basis an inventory of all public lands and their resources and other values, and when appropriate, revise land use plans. This includes an inventory of lands with wilderness characteristics that are outside of the areas designated as WSAs or units of the National Wilderness Preservation System. The BLM shall describe such inventoried lands as "Lands with Wilderness Characteristics," share this information with the public, and integrate this information into its land management decisions.

The inventory and evaluation for this plan focused on current lands and lands acquired outside of, or adjacent to designated wilderness, since passage of the CDPA in 1994. Lands were inventoried for wilderness characteristics, and areas containing these

characteristics are considered in the planning process regarding appropriate means to manage them (see Chapter 2.0).

Lands acquired within the boundary of the North Algodones Dunes Wilderness are automatically part of the wilderness (Section 6 of Wilderness Act). Lands acquired through donation adjacent to designated wilderness may become part of the wilderness if the Secretary of the Interior gives 60 days advance notice to the President of the Senate and the Speaker of the House of Representatives.

Based on the above criteria and process, the BLM evaluated the planning area for lands with wilderness characteristics. Although released by Congress from WSA status, a portion of the previous South Algodones Dunes WSA was found to contain wilderness characteristics. The area has been identified as WCU 1.

The WCU 1 contains 42,083 acres of public lands. The area's west boundary follows the edge of the dune system, whereas the east boundary follows Wash Road adjacent to the UPRR tracks. The north and south boundaries indicate the limit of substantially noticeable impacts resulting from OHV use. The WCU 1 is completely surrounded by public lands and has a 640-acre section of private lands in the middle. Although WCU 1 may be traversed by a limited number of OHVs in the winter, and small portions of the landscape include trails which are 20- to 50-foot-wide strips devoid of vegetation, the area appears essentially untrammled by humans, although small portions of the landscape include trails which are 20- to 50-foot-wide strips void of vegetation. The undulating topography shields recreationists from each other and provides ample opportunities for solitude. OHV and military aircraft noise periodically disrupt these perceptions of solitude. The WCU 1 offers numerous opportunities for primitive forms of recreation in the form of hiking, backpacking, and nature studies.

3.13.3 Areas of Critical Environmental Concern

To qualify as an ACEC, an area must meet the FLPMA relevance and importance criteria in 43 CFR 1610.7-2 and must require special management. A natural or cultural resource may be determined relevant if special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values; fish and wildlife resources; or other natural systems or processes; or to protect life and safety from natural hazards. A natural or cultural resource may be found to be important if it has qualities that give it special worth, consequence, meaning, distinctiveness or cause for concern (e.g., if the resource is endangered, threatened, or vulnerable; or if the resource is fragile, sensitive, rare, or irreplaceable). The CDCA Plan states that the goals of the ACEC program are to:

1. Identify and protect the significant natural and cultural resources requiring special management attention found on BLM-administered lands in the CDCA.

2. Provide for other uses in the designated areas, compatible with the protection and enhancement of the significant natural and cultural resources.
3. Systematically monitor the preservation of the significant natural and cultural resources on BLM-administered lands, and the compatibility of other allowed uses with these resources (BLM 1999).

Within the Planning Area, there are three ACECs designated for natural and cultural resource values: East Mesa ACEC, Plank Road ACEC, and North Algodones Dunes ACEC (Table 3-16). Each ACEC has its own management plan.

**TABLE 3-16
ACECS IN THE PLANNING AREA**

ACEC¹	Total BLM-administered Acres
East Mesa	6,454
Plank Road	416
North Algodones Dunes	25,756

¹BLM's land use decisions and management actions only apply to BLM-administered lands within the ACEC.

3.13.3.1 East Mesa ACEC

The Planning Area includes a portion of the East Mesa ACEC, located adjacent to the southwest corner of the Planning Area. This ACEC was established in 1980 to protect the flat-tailed horned lizard 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. The Southern East Mesa ACEC Management Plan of 1982 includes actions to protect these features of relevance and importance. The plan is incorporated by reference and may be modified based on the ROD for the ISD RAMP.

3.13.3.2 Plank Road ACEC

In 1985, the BLM designated the Plank Road an ACEC. The Plank Road, located in the southern portion of the Planning Area, is a historic cultural resource. The Plank Road ACEC contains the last intact remnant of what was once an important east-west wood-plank vehicle route across the ISD. The Plan Road ACEC Management Plan of 1985 includes actions to protect these features of relevance and importance. The plan is incorporated by reference and may be modified based on the ROD for the ISD RAMP.

3.13.3.3 North Algodones Dunes ACEC

The North Algodones Dunes ACEC was designated in 1989/1990 by CDCA Plan Amendment 13. Under the California BLM "umbrella" concept, all special areas are also

designated as ACECs to help eliminate the proliferation of terms. It was determined that the dune system and associated resources within the North Algodones Dunes meet the ACEC criteria of relevance and importance. The North Algodones Dunes CDCA Plan amendment is incorporated by reference and may be modified based on the ROD for the ISD RAMP.

3.13.4 National Natural Landmark

The National Natural Landmark (NNL) Program recognizes and encourages the conservation of sites that contain outstanding biological and geological resources regardless of landownership type. Sites are designated by the Secretary of the Interior with landowner concurrence. NNLs are owned by a variety of land stewards, and participation in the program is voluntary. The goals of the NNL Program are:

to encourage the preservation of sites illustrating the geological and ecological character of the United States, to enhance the scientific and educational value of sites thus preserved, to strengthen public appreciation of natural history, and to foster a greater concern for the conservation of the nation's natural heritage. (National Park Service 2011)

The Imperial Sand Hills NNL was designated in 1966 because it is considered an outstanding example of dune geology and ecology in an arid land and one of the largest dune patches in the United States. The NNL designation comprises approximately 23,000 acres within the Planning Area (Map 3-7). This NNL is protected by subsequent wilderness designation and the MUC classification assigned.

3.14 Mineral Resources

The principal mineral resources in the Planning Area are sand and gravel and geothermal. The blow sand 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. All sand and gravel sales activity is found on the Glamis–Boardmanville Class M lands.

There is one mining claim in the Planning Area. No mineral extraction has occurred in this area, and potential for practical extraction appears to be low (BLM 1999 and 1987).

3.14.1 Mineral Resource Potential

The Planning Area is located along the eastern boundary of the Salton Trough, southeast of the Salton Sea. Within this area, the Salton Trough is an active, major structural and topographic basin extending from the upper Coachella Valley south through the Gulf of California. The Salton Trough is located at the southern termination

of the San Andreas transform fault system, believed to be one of the few places where oceanic rifting is actively imposed on continental crust resulting in thermal activity, faulting, and associated seismicity and volcanism. This trough and the bounding San Andreas and San Jacinto fault zones outline the Colorado Desert province. The Planning Area is situated below the terminus of the San Andreas Fault zone within and east of the area of transform faulting.

The Salton Trough is the result of a relative change in direction of the boundary between the East Pacific Rise and North American plate during the late Cenozoic, resulting in apparent rifting through to the Gulf of California. The opening of the trough and the adjacent Gulf of California to the south probably started in Miocene time. Transform movement along the strike slip system south of the current Salton Sea, resulting in apparent rifting, is estimated to have occurred in the Pliocene. This zone of transitional faulting results in faster spreading in the trough and subsequent extension and depression of the surface, widening southward into the Gulf of California.

The 130-mile long landward extension of the trough can be separated into two regions, the northern portion incorporating the Coachella Valley and a southern portion including the Imperial Valley above the U.S.–Mexico border. Significant deltaic sedimentation resulted from discharge of the westerly flowing Colorado River filled and dissected the northern extension of the gulf in the trough from the Imperial Valley, south to the Gulf of California. Periodic episodes of volcanic flows and debris deposits are imprinted within the fluvial sediments. Within the landward part of the trough, sedimentation reaches depths up to 6 kilometers in the Imperial Valley.

The Planning Area is underlain by surficial eolian sand deposits, and by deltaic sands and gravels, and possibly volcanic flow rocks at depth.

3.14.2 Locatable (Metallic and Non-metallic) Minerals

Minerals subject to location under the General Mining Law of 1872 (30 USC 22, et seq.; as amended) include metallic minerals such as gold, silver, copper, lead, zinc, and uranium; non-metallic minerals such as asbestos, barite, gypsum, and mica; and uncommon varieties of stone (43 CFR 3800). The General Mining Law of 1872 allows citizens and those seeking to become citizens of the United States the right to enter upon public lands and reserved interests for the purposes of exploration and development of minerals subject to this mining law. Appropriation of a mineral deposit is made by location of a mining claim. No rights under the mining laws can be exercised by a claimant until a discovery of a valuable mineral deposit has been made within the boundaries of the mining claim.

Exploration and development must be conducted in accordance with all applicable laws, regulations, and policies, and in conformance with the approved land use plan.

Restrictions and stipulations may be applied to a proposed activity based on review and analysis by the authorized officer.

All activity is managed under the authority of the regulations at 43 CFR 3809 (public lands and wilderness). Authorization is based on the level of disturbance and whether the activity is conducted in a special designation area. Casual use activities such as panning for gold, prospecting, and monumentation of mining claims, are authorized by the regulations where disturbance would be nominal. No approval is required from the authorized officer of the BLM. Where exploration activities would cause more than nominal disturbance and surface disturbance is 5 acres or less, a notice is required to be reviewed by the authorized officer of the BLM to assure that unnecessary or undue degradation would not occur to public lands or resources. A plan of operations is required for surface disturbance greater than 5 acres, in a special area, or for mining activity greater than casual use. A plan of operations must be approved by the authorized officer of the BLM and may be subject to stipulations to assure conformance with the land use plan.

BLM manages to protect sensitive resources by defining protective prescriptions in land use planning that are to be applied in any approval of activities. Where mineral development activity would adversely affect sensitive resource values, the BLM may petition for withdrawal of an area from the operation of the mining laws. Withdrawals greater than 5,000 acres must have congressional review and approval.

3.14.2.1 Potential for Accumulation and Occurrence of Metallic and Non-metallic Minerals

The BLM does not currently have any active approved plans of operation for metallic mining in the Planning Area. There is one mining claim recorded (Appendix N) in BLM-administered lands within the Planning Area. This mining claim is presumably located for placer gold, although no surface mining activity is known from the area. No known activity for nonmetallic/industrial minerals currently occurs in the Planning Area.

3.14.2.2 Potential for the Development of Metallic and Non-metallic/Industrial Minerals

Locatable minerals of interest in the Planning Area are limited to gold. The mineral deposit model for the area is based on the Mesquite Mine, approximately nine miles east of the Planning Area. The model is defined as disseminated free gold hosted in gneiss and granitic rocks, and quartz veins in either rock unit. Gold mineralization in southeastern Imperial County area is along the upper plate of the Chocolate Mountain thrust zone. East of the recreation area, the thrust zone and upper plate units are exposed at the surface (Mesquite, American Girl, Picacho mines), ranging to many thousands of feet below the surface elsewhere. It is unlikely that this mineralization

exists within the economics of open pit mining methods commonly employed and necessary to develop these type deposits in the Planning Area.

The geologic environment is limited to low grade gold lode deposits. Metallic and nonmetallic/industrial minerals have historically been limited to surface mining operations. Potential for development of large-scale open pit metal mines is nonexistent in the Planning Area because the deposits appear to be too deep to access by surface operations in the eastern portion.

Based on the level of activity in the last 20 years and the potential for locatables on BLM-administered lands within the Planning Area, potential future mineral development activity is estimated to be low to nonexistent.

3.14.3 Leasable (Fluid and Solid Energy, and Solid) Minerals

Leasable minerals include fluid energy mineral deposits such as oil, gas, coal bed methane, CO₂, and geothermal resources. Solid energy and or industrial minerals, such as coal, sodium, and potash, are also disposed of from public lands by the BLM through lease. BLM defines geothermal resources as renewable energy fluid minerals that can be developed after obtaining a lease from BLM.

Laws and regulations applicable to federal leasing in the Planning Area include:

- Mineral Leasing Act of 1920 as amended and supplemented
- Acquired Lands Mineral Leasing Act of 1947
- Mining and Minerals Policy Act of 1970
- Geothermal Steam Act of 1970
- Federal Onshore Oil and Gas Leasing Reform Act of 1987
- 43 CFR 3100 (Oil and Gas Leasing)
- 43 CFR 3200 (Geothermal Resources Leasing)
- BLM Manual Series 3100—Onshore Oil and Gas Leasing (and handbooks)

A mineral lease is an agreement affording the right to access and develop mineral resources contained within the boundaries of the leased area in compliance with the lease terms and in conformance with appropriate local, state, and federal laws and regulations. Where information necessary to classify as valuable public lands for minerals subject to the leasing laws, prospecting permits may be authorized before

leases would be approved. Where mineral deposits subject to leasing are known to be valuable, BLM may offer to lease through competition. Competitive leasing is required for all oil and gas. Leases are typically termed for 20 years and are extended as long as the leasehold is in production. A payment of an annual lease rental or a royalty for minerals produced is made to the United States by the lessee.

In some situations where sensitive resource values occur, a lease may be issued with a NSO requirement. This requirement must assure that the mineral deposit on the lease could be developed by means of off-site development.

A determination that lands are available for leasing represents a commitment to allow surface use under standard terms and conditions unless stipulations constraining development are attached to leases. When applying leasing restrictions, the least restrictive constraint to meet the resource protection objective would be used.

Private leasing of federal mineral estate on lands where the surface is not held by the federal government is done in accordance with federal law, regulations, and policy guidance. The surface owner is notified prior to lease and given the opportunity to comment.

3.14.3.1 Potential for Accumulation and Occurrence of Fluid and Solid Energy, and Solid Leasable Minerals

There is no potential for coal resources or other solid leasable minerals in the Planning Area. The Planning Area is classified as prospectively valuable for oil and gas and geothermal resources.

3.14.3.1.1 Oil and Gas Resource Potential

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 North Algodones Dunes WSA in 1981 and 1982, prior to a moratorium on WSA leasing. Development of oil and gas resources is low due to geologic conditions within the Planning Area. There are no known oil and gas fields, or development of oil and gas resources in Imperial County.

The BLM Manual at 3021.21 B provides the criteria for classifying lands prospectively valuable for oil and gas. These criteria are:

- Minimum 1,000 feet thickness in a sedimentary basin
- Maximum 35,000 feet thickness in a sedimentary basin

- Evidence of oil and gas potential such as seeps, oil or gas shows in well tests, and past or present production. Indirect evidence such as seismic and similarity with other producing rocks can be used in the classification.

The geology of the area does support that there are 1,000 feet of sediments within a sedimentary basin in and around the Planning Area. There are no producing oil or gas wells or known geologic structures of a producing oil field or zone within the Imperial County. The records of wells maintained by Munger or California Division of Oil, Gas, and Geothermal Resources do not show that any oil or gas wells have been drilled within or near the Planning Area (Munger 1992). Development potential for oil and gas resources is low due to unfavorable geologic conditions as provided in BLM Manual 3031.

3.14.3.1.2 Geothermal Resource Potential

Hydrothermal waters occur in the high heat flow regime along fault margins and zones structurally forming the Salton Trough. The thick marine and nonmarine sediments overlaying these systems insulate these hydrothermal areas. Permeable zones within coarser sediments channel thermal waters allowing access by drilling to geothermal fluids.

Based on BLM work in the area, geothermal resource with sufficient temperatures (350+° F) in the Planning Area may be too deep (greater than 10,000 feet) and the formations are not very permeable at that depth to allow sufficient flow for generating electric power directly. In addition, analytical work completed by various companies in the area support that the closer to SR-78, the water chemistry begins to increase in TDS, yielding a deep, hot, briney, tight resource that most companies are not currently interested in developing.

In developing the Salton Sea area, companies tolerate high TDS (150,000+) because of the enthalpy and permeability of the resource. Geothermal fluids below 7,000 feet from the Salton Sea area can vary in TDS from 7,000 milligrams per liter to over 200,000 milligrams per liter, and can contain some suspended solids. The suspended solids and dissolved solids that precipitate out of solution for a flash-type geothermal plant could present a disposal challenge as they could be hazardous waste (BLM 2007b). Based on deep wells (over 13,000 feet deep) drilled between the East Highline Canal and Brunt's Corner on SR-78 in 1980 and 1981. The geothermal resource was hot, but too deep to be commercial at the time. There has been little interest to develop geothermal resources below 10,000 feet where the rocks have poor permeability, and have a higher TDS than East Mesa.

The area between the East Brawley, Glamis, and East Mesa Known Geothermal Resource Areas (KGRAs), including the Planning Area, is classified by the BLM as being

prospectively valuable for geothermal resources. BLM Manual 3021 provides the criteria for classifying lands prospectively valuable for geothermal resources.

Surface manifestations of geothermal resources are not common in this area. There are no warm springs or surface indication of volcanism. Therefore the search for geothermal resources depends on temperature and heat flow measurements from shallow and deep wells and from data generated through indirect methods such as geochemistry, gravity, magnetic, and regional geology.

While the Planning Area is located neither within an area of thermal springs nor an area of Quaternary volcanic activity, there are fault related thermal areas accessed by drilling, as evidenced on the surface by mud holes (pots) near the Salton Sea. In addition, geothermal development is occurring east of the Planning Area, where thermal gradient holes have obtained gradients 40° F higher than ambient temperatures in the area.

Two KGRAs have been identified within the Planning Area, the Glamis KGRA and the Dunes KGRA (Map 3-8). 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 Planning Area.

There are no geothermal leases or applications for leases within the Planning Area. No geothermal exploration activity has been approved by the BLM on public lands for temperature gradient holes in the area.

3.14.3.2 Potential for the Development of Fluid and Solid Energy, and Solid Leasable Minerals

Geothermal resources can be classified as low temperature (less than 90°C [194°F]), moderate temperature (90°C–150°C [194–302°F]), and high temperature (greater than 150°C [302°F]). Geothermal resources can provide kinetic energy to drive steam turbines directly, or through heat exchange with other mediums to provide kinetic energy to drive turbines to create electricity or other work. All geothermal uses are influenced by available temperature. High temperature resources are generally used only for electric power generation.

Based on heat flow information, the areas classified by the BLM as KGRAs, have a moderate to high potential for the development of direct geothermal steam applications.

Uses for low and moderate temperature resources can be divided into two categories: direct use and ground-source heat pumps. Direct geothermal use involves using the heat in the water directly (without a heat pump or power plant) for such things as heating

of buildings, industrial processes, greenhouses, aquaculture (fish farming) and resorts. Direct use projects generally use resource temperatures between 38°C (100°F) to 149°C (300°F). Because the Planning Area is remotely located in Imperial County and not within a reasonable distance to transmit geothermal waters for direct heat applications, the potential for heat source application is considered low.

The North Algodones Dunes Wilderness is closed to all geothermal leasing. The remaining ISD SRMA is open to leasing subject to an NSO stipulation. All areas outside the ISD SRMA are open to leasing with appropriate mitigation. Although such activities take place elsewhere in the vicinity of the Planning Area, no geothermal leases have been issued; and no development has taken place within the Planning Area.

No development of oil or gas resources has occurred within the Planning Area.

3.14.4 Salable (Construction Material) Minerals

Salable minerals include construction materials such as sand, gravel, cinders, decorative rock, and building stone as described in 43 CFR 3600. Disposal of mineral materials from BLM-administered lands requires either a sales contract or a free use permit from the appropriate BLM office. Disposal of mineral materials is authorized in accordance with appropriate laws, regulations, and policies in conformance with the approved land use plan and if disposal is determined to be in the public interest. Use of public lands and resources for salable mineral development cannot be allowed if not in the public interest, and if such action would result in unnecessary or undue degradation to public lands or resources.

Laws and regulations applicable to salable minerals on public lands in the Planning Area include:

- Acquired Lands Mineral Leasing Act of 1947
- Mineral Materials Act of 1947 as amended
- FLPMA; and 43 CFR Part 3600
- Surface Resources Act of 1955
- BLM Handbook H3042-1—*Solid Minerals Reclamation Handbook*
- BLM Manual and Handbook 3600

Glamis I and Glamis II, located east of Glamis and north of SR-78, are the only sand and gravel pits operating within the Planning Area. Imperial County Public Works operates the Glamis pits under a BLM free use permit to supply aggregate material for Imperial County road projects. The Glamis pits comprise a total of approximately 1,040 acres and

produce from 5,000 to 50,000 cubic yards per year, for a lifetime production of approximately 1.5 million cubic yards (Imperial County n.d.).

3.14.4.1 Potential for Accumulation and Occurrence of Construction Materials

The geologic environment within the Planning Area supports the accumulation of quality sand and gravel deposits.

3.14.4.2 Potential for the Development of Construction Materials

The geologic environment within the Planning Area is limited to older shoreline deposits and distal alluvial fan outwash in the far northeastern corner of the area.

There are currently no authorizations on BLM-administered land for mineral materials in the Planning Area.

The local needs for construction materials are proportional to expected growth in Imperial County. Future development of construction materials is limited to areas where available resources are currently being developed. Within the Planning Area, there is a low potential for the occurrence and development of construction materials. There are no current or foreseeable markets identified in the Planning Area where graded aggregate and sand could be developed and sold within the local market from public lands. It is unlikely that quality aggregate exists in the Planning Area as the area is classified as having a low potential for the occurrence or accumulation of aggregate resources.

3.15 Recreation Management

The Planning Area, which contains the ISD SRMA, is a unique recreation resource in the southwestern United States. The Planning Area fills a unique and valued niche for providing a wide spectrum of recreation opportunities, including OHV recreation. A recreation opportunity is commonly defined as the opportunity for a person to participate in a particular activity in a specific setting, in order to realize a preferred type of experience and subsequent benefits. Thus a recreation opportunity is an integrated package of activities, settings, experiences, and benefits. OHV recreation is a broad term that encompasses many types of desired motorized recreation opportunities. OHV management is discussed in Section 3.16, Transportation and Public Access.

The ISD SRMA encompasses 138,111 acres of BLM-administered lands (see Map 1-1). BLM identifies SRMAs where the resources of the public lands attract visitors from one of the three following recreation markets:

- Public lands with a demonstrated *community* recreation-tourism market would be managed as a Community SRMA. A Community SRMA is managed in collaboration with the local community to primarily benefit the local residents.
- Public lands with a demonstrated *destination* recreation-tourism market would be managed as a Destination SRMA. A Destination SRMA is managed as a regional or national destination through collaborative partnerships.
- Public lands with a demonstrated *undeveloped* recreation-tourism market would be managed as an Undeveloped SRMA. An Undeveloped SRMA is managed to intentionally maintain dispersed and undeveloped recreation opportunities.

The recreation management area is a land unit where Recreation and Visitor Services objectives are recognized as a primary resource management consideration and specific management is required to protect the recreation opportunities. The recreation management area designation is based on: recreation demand and issues, recreation setting characteristics, resolving use/user conflicts, compatibility with other resource uses, and resource protection needs.

The recreation management area is designated as either a SRMA or an ERMA. SRMAs recognize unique and distinctive recreation values and are managed to enhance a targeted set of activities, experiences, benefits, and recreation setting characteristics, which becomes the priority management focus. ERMAs recognize existing recreation use, demand, or Recreation and Visitor Services program investments and are managed to sustain principal recreation activities and associated qualities and conditions of the ERMA, and are managed commensurately with other resources and resource uses.

Public lands that are not designated as recreation management areas are managed to meet basic Recreation and Visitor Services and resource stewardship needs. Recreation is not emphasized; however, recreation activities may occur except on those lands closed to public use. The Recreation and Visitor Services are managed to allow recreation uses that are not in conflict with the primary uses of these lands. Management actions and allowable use decisions will still be necessary to address basic Recreation and Visitor Services and resource stewardship needs: e.g. visitor health and safety, and user conflicts.

3.15.1 Regulatory Framework

Since its designation, the ISD SRMA has been managed according to mandates set forth in both the 1980 CDCA Plan and the 1976 FLPMA. In establishing the CDCA, the Congress found:

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. (CDPA, USC 1781[a][4])

The CDCA Plan of 1980, as amended, provides overall management direction for all public lands in the CDCA.

3.15.2 Fee Program

The SRP fees are periodically revised as required and subject to a public review process. FLREA has replaced the former Recreational Fee Demonstration Program and the Land and Water Conservation Fund Act as the authority for the BLM to collect fees. Additionally, the BLM collects fees through its SRP program under the authority of FLPMA and regulations at 43 CFR 2930. The SRP program includes fees collected from competitive events, commercial activities, organized group events, vending and for special area use. Fees collected from ISD visitors are individual, non-commercial SRPs.

BLM is permitted to retain 100 percent of the new fees collected. The funds generated are used for the operation, maintenance, and any improvements to enhance recreation opportunities and visitor experiences within the subject BLM field office.

3.15.3 Special Recreation Permits

Within the Planning Area, individual non-commercial SRPs are required for motorized recreational use. Recreationists may purchase their permits through various offsite vendors before they arrive, or they may choose to purchase from onsite vendors or BLM once they arrive at the Planning Area. One permit is needed per primary vehicle. A primary vehicle is any street-legal vehicle used for transportation to the recreation site. A permit is required immediately upon arrival to the Planning Area.

Commercial, competitive, and organized group activity and vending permits are also available from the BLM El Centro Field Office. Applications must be submitted 180 days in advance and are issued per BLM regulations.

3.15.4 Volunteer Events

The BLM coordinates with volunteer groups throughout the year. There is an annual clean-up day, coordinated by United Desert Gateway, which has occurred over Martin Luther King weekend for the past 13 years. There are also monthly (smaller) clean-up events throughout the recreation season (generally October 1 through May 31). Volunteer camp hosts at Gecko Road, Dune Buggy Flats, and Buttercup Ranger Station live on-site throughout the recreation season to provide information about camping and recreation within the SRMA.

The BLM often coordinates special volunteer projects to accommodate the needs of service groups such as the Boy Scouts of America. A volunteer project was undertaken by an Eagle Scout candidate who landscaped the Buttercup Ranger Station with native plants.

3.15.5 Visitor Use Areas

The ISD SRMA contains several Visitor Use Areas, as follows, and each includes a variety of recreation opportunities:

- **Mammoth Wash:** This is an open area that is the most remote OHV recreation area within the Planning Area due to its northern location. The Mammoth Wash open area is about 5 miles long and 2 miles wide and is accessed by Niland–Glamis Road. The open area is available for use by OHV off designated routes; by definition, an open area provides for OHV use anywhere within its boundaries. The distance from the pavement to the staging area is approximately 13 miles. Visitation is usually low in this area. Visitors to this area enjoy the remote location away from the intensively used areas of the Planning Area. On weekends during the recreation season (October–May), visitors tend to be residents from the nearby communities of Niland and Calipatria.
- **North Algodones Dunes Wilderness:** This area is located between the Mammoth Wash open area and SR-78. A watchable wildlife site is located on the Niland–Glamis Road, two miles north of SR-78. The site provides interpretive displays on the wildlife and dunes habitat and also provides an excellent staging area for hikes and school field trips. Hikers into the wilderness can observe indigenous plant and animal species such as the PMV, fringe-toed lizard, mule deer, and other desert animals. Additional detail related to facilities in this area are found in Section 3.15.5.3 below.
- **Glamis/Gecko Area:** This area is located just south of SR-78 is the most intensively used OHV recreation area within the Planning Area. This area is designated an OHV open area. Gecko Road is the most developed area, with numerous developed campgrounds and other facilities. Cahuilla Ranger Station, located along Gecko Road, is the headquarters for the ISD SRMA and incident command center for dunes operations and most personnel are based out of the station. Other facilities along Gecko Road include: Gecko Campground, Keyhole Campground, Roadrunner Campground, 8 hardened camping pads, a vendor area, vault toilets, trash facilities, and kiosks. Additional detail related to facilities in this area are found in Section 3.15.5.3 below.
- **Glamis Area (eastside):** This area is undeveloped, contains minimal facilities, and provides for open desert camping and is an open OHV area. The main access into the Glamis area is via Wash Road, which was historically adjacent to the UPRR

tracks and within the UPRR ROW. During the summer of 2009, BLM developed a new Wash Road, located on BLM-managed lands.

- **New Wash Road:** This area is located adjacent to the UPRR ROW and allows for safe and easy access to the camping area known as the Washes.
- **Glamis and Palo Verde Flats areas:** These are open desert camping areas accessed from SR-78. The BLM provides trash facilities, law enforcement, emergency medical services, and toilet facilities through a combination of funding sources, including fee programs, tax appropriations, and California State Parks Off-highway Motor Vehicle grants. The town of Glamis is privately owned and supports three OHV-oriented businesses. The small settlement of Boardmanville is just east of Wash 10, southeast of Glamis. Additional detail related to facilities in this area are found in Section 3.15.5.3 below.
- **Dune Buggy Flats area:** This area is located in the southern portion of the Planning Area and is located north of I-8. The main access into the area is via the Gordons Well exit off I-8 and an improved dirt road. This is an intensive OHV recreation area similar to the Glamis/Gecko area and is an OHV open area. Facilities located within this area include: a kiosk, signs, trash facilities, camp hosts, toilets, and a portable ranger station trailer staffed by BLM staff on some holiday weekends. Additional detail related to facilities in this area are found in Section 3.15.5.3 below.
- **Area west of the Coachella Canal and adjacent to Gordons Well Road:** This area was closed (March 2002) to camping in order to protect the flat-tailed horned lizard (*Phrynosoma mcalli*) and its habitat. The closure was the result of a BO that mitigates impacts of the Herman Schneider Memorial Bridge. The bridge opened in April 2001 and provides OHV access across the All-American Canal and the shared use (OHV and street-legal vehicles) of the Gordons Well overpass. This bridge allows OHV enthusiasts legal access across I-8 from the Buttercup Valley to the Dune Buggy Flats area. Prior to the bridge construction, there were illegal and dangerous OHV crossings across I-8. The land east of and adjacent to the closed area is privately owned and supports an OHV-oriented private business as well as campgrounds and residences.
- **Ogilby Camp and Dunes Vista areas:** These areas are located in the southeastern portion of the Planning Area. The access to this area is via the Ogilby Road and a dirt/sand road. This area is similar to Mammoth Wash, and there are no facilities or services except BLM patrols. Visitation is low to moderate, with most use occurring on weekends and holidays.
- **Buttercup Area:** This area is located south of I-8 and north of the U.S.–Mexico border. Buttercup Ranger Station is located here and provides visitor information (maps, education materials, information about the ISD) and emergency medical

services. Permits are sold here (there is a kiosk for busy weekends) and the station serves as a law enforcement facility during busy weekends. Grays Well Road provides access to Buttercup, Midway, and the Plank Road camping areas. All three camping areas have vault toilets, and trash facilities. At Plank Road, a metal protective barrier and interpretive signs surround the remnants of the old wooden road that enabled vehicles to cross the ISD in 1915. These areas are all within a 20-minute drive to Yuma, Arizona, where there are shops and a hospital. The Mexico border town of Algodones is also nearby. Visitors can drive street vehicles, park, and then walk across the border to shop and eat. Additional detail related to facilities in this area are found in Section 3.15.5.3 below.

Near the Planning Area, OHV recreation opportunities are limited to existing trails and routes. There is a network of trails east of the ISD that extends to the Colorado River and north to I-10. There are several wilderness and military closures that limit access. Very little OHV recreation opportunity exists directly west of the Planning Area in the East Mesa. The cities of Brawley, Imperial, Holtville, and El Centro lie west of the Planning Area. On the far western side of the valley lie the Ocotillo Wells State Vehicle Recreation Area, Plaster City, and Superstition Mountains. These are open areas with limited use areas around them.

3.15.5.1 Recreation Settings

The majority of the visitation in the Planning Area occurs from October through May. Summer visitation level is low due to extremely high temperatures, although some OHV activity does occur during the summer nights. Typically, the Planning Area experiences high levels of visitation during Halloween, Thanksgiving, New Year's Eve/Day, and Presidents' Day. Visitors during these time periods will experience crowds and noise. Visitor experiences during other times will be of low to moderate levels of visitor interaction.

In addition to the camping areas on the exterior of the Planning Area, visitors have historical congregation sites within the Planning Area, most of which are within the ISD SRMA. Vendor row (alternatively known as the mall) is an area in Glamis Flats that has been historically used for vending of commercial goods and services. The vendors set their sites along the south side of SR-78 between the Glamis Flats off-ramp and the Glamis private property line. Rows often form, facing each other with OHV traffic flowing between the vendors. Additional rows, similar in design, generally follow along the west private property boundary of Glamis. These vendors are permitted through the BLM under the SRP program. The holiday crowds, in conjunction with the vendors, seem to create a carnival atmosphere.

There are also historical gathering areas farther into the dunes. Some of these sites are Competition Hill, the sand drags, Oldsmobile Hill, Patton Valley, Test Hill, and Buttercup

Valley. Visitors meet at these locations to test their OHVs, riding skills, and for informal competition. Visitation at these sites peak during different times of the day and are usually busiest during the holidays. The crowds at the sand drags start to gather during the late afternoon and dissipate at dusk, while Oldsmobile Hill, Test Hill, and Buttercup are busy day and night. The crowds at Competition Hill start to gather around eight o'clock in the morning, but there is a county-imposed dusk-to-dawn curfew in effect.

The Planning Area can provide a place for the public to experience solitude and silence or busy crowds and noise. At either end of this spectrum, the visitor has the opportunity to experience vast wide-open spaces once out into the dunes system and away from the roads and campgrounds.

3.15.5.2 Recreation Programs

Recreation programs include developed and dispersed camping, and interpretive/informational/educational services. Although there are developed campgrounds in the Planning Area, there are no delineated camping spaces in any of the campgrounds. Camping is dispersed in both developed and primitive areas of the Planning Area. Interpretive/informational/educational services are provided at Cahuilla Ranger Station through displays and contact with a BLM Park Ranger. There are interpretive panels at the watchable wildlife site and the Plank Road that provide natural and cultural resource information. Informational kiosks are located in several locations throughout the Planning Area near the major ingress/egress points. The private businesses sell maps of the area and also display and handout BLM literature free of charge. BLM staff frequently conducts informational stops at the major entry points and staff distributes literature to visitors as they enter the Planning Area. As staffing allows, BLM also conducts guided hikes into the North Algodones Dunes Wilderness for the local community and school field trips.

Due to the level of visitation and workload, Imperial County and the BLM work closely together on medical incidents that occur in the Planning Area. The emergency medical services work has become an integral part of the recreation division in the BLM. The BLM continues to increase its coordination of emergency medical services with the county each year. In the field, both BLM emergency medical technicians and advanced life support ambulance personnel work together as a team to provide the best level of medical aid possible. The BLM has off-highway 4x4 vehicles, two rescue buggies, and skilled staff to extract accident victims from the Planning Area and transport them to the nearest paramedic ambulance. See Sections 3.18 and 4.18 for more information on law enforcement and rescue.

3.15.5.3 Facilities

Although camping is allowed everywhere within the ISD SRMA, except for the Administrative Closures, the area available for two-wheel drive vehicle overnight camping is limited. The sandy terrain limits access to most of the ISD SRMA for vehicle camping. The acreage that is suitable is primarily along Gecko Road, a portion of the Glamis area, the western side of the Mammoth Wash area, Dune Buggy Flats, the eastern portion of the Ogilby area, and the area adjacent to Grays Well Road in Buttercup.

The Planning Area has two developed campgrounds adjacent to Gecko Road. Gecko Campground is located approximately 3.5 miles south of SR-78. It consists of north and south loops that extend out into a rolling sand dunes area. Roadrunner Campground is located at the terminus of Gecko Road, approximately 5 miles south of SR-78. It consists of one loop that extends out into a flat sandy area. Both campgrounds are the only developed camping areas in the Glamis/Gecko Area. The southern portion of the Roadrunner loop and the northern loop of Gecko Campground are filled in with hard dirt/gravel material to provide camping space. Both campgrounds also provide pit toilets. Two additional developed sites located in the southern portion of the Planning Area (south of I-8) are the Buttercup Campground and Midway Campground.

The BLM has constructed eight dirt/gravel pads in order to provide additional camping areas for two-wheel drive vehicles. The rest of the camping in the Planning Area is relatively dispersed, although visitors tend to stay in historically used areas such as Glamis, Gecko, Buttercup, and Dunebuggy Flats. These areas provide trash dumpsters, and have pit toilets.

Cahuilla Ranger Station is located on Gecko Road near SR-78. The station provides interpretive services and information to visitors. It also serves as the incident command center during holiday weekends for the BLM and as a contact point for emergency services. There is also a maintenance shed to accommodate BLM OHVs, emergency vehicles, and supplies.

Buttercup Ranger Station, located in the Buttercup area south of I-8, provides visitor information (maps, education materials, information about the ISD) and emergency medical services. Permits are sold here (there is a kiosk for busy weekends) and the station serves as a law enforcement facility during busy weekends.

3.15.6 Recreation Visitation

The Planning Area is located within a three-hour drive from Los Angeles, Orange County, Riverside, San Diego, and Phoenix. The ISD SRMA 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 unparalleled and 2) it fills a unique and

valued niche for providing the largest acreage of dune-oriented, motorized recreational opportunities in the United States. The ISD SRMA has far more acreage than the 10 other dune areas that are located within 1,500 miles.

Continued population growth in southern California, the expanding popularity of OHV recreation (108 percent increase since 1980 in California), and a decrease in the acreage available to OHV recreation in the California Desert, has resulted in a steady increase in visitation within the Planning Area. Due to the increased demand for OHV recreation, there has been a need for increased law enforcement.

The Planning Area provides for many types of recreational experiences, with OHV recreation as the dominant activity. The OHV enthusiasts who visit on holiday weekends will experience large crowds, noise, and intensive, 24-hour OHV activity in areas such as Glamis, Gecko, Dune Buggy Flats, and Buttercup. There are other locations within the Planning Area where OHV recreation is less intense on holiday weekends and visitors can have a quieter, less intensive experience (Mammoth Wash or the Ogilby areas). The majority of the opportunity lies during weekdays and non-holiday weekends when a range of recreational settings can accommodate many different types of experiences.

The Planning Area is managed to provide both non-motorized and motorized recreational opportunities to area residents and visitors. In addition to OHV recreation, the Planning Area 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. The Planning Area also provides a special niche that produces a particular social experience. It provides wide-open spaces where enthusiasts can seek solitude or a substantially modified natural environment with facilities for a highly intensified motorized recreation experience.

The types of vehicles that are used within the Planning Area include OHVs and street-legal vehicles. The vehicle types that can be found include: sand rails, dune buggies, all-terrain vehicles, side-by-sides, motorcycles, 4WD pickups, 2WD pickups, sport utility vehicles, and custom built off-road vehicles. Private, law enforcement, military, commercial and rescue aircraft frequently fly over the dunes at low altitudes.

The earliest known annual visitation within the Planning Area was 150,000 in the late 1970s; the number of visits had increased to 225,900 visits in 1985 (BLM 1987). Table 3-17 shows the estimated annual visitation within the Planning Area for fiscal years 2004 through 2009.

**TABLE 3-17
PLANNING AREA VISITATION,
FY2004–FY2009**

Fiscal Year	Visitation¹
FY2004	1,372,630
FY2005	1,392,389
FY2006	1,464,580
FY2007	1,457,685
FY2008	1,376,394
FY2009	1,312,526
Average	1,396,034
Forecast (Planning Period)	1,225,000

¹Visitation numbers were generated by multiplying vehicle counts by 3.5, the average occupancy per primary vehicle. A visit occurs when one person visits BLM lands to engage in any recreational activity, whether for a few minutes, full day, or more.

Average annual visitation for fiscal years 2004 through 2009 was estimated at almost 1.4 million visitors, with peak visitation between October and April. The visitation levels for the Planning Area peaked in FY2006 and have declined each subsequent year, likely due to the weak economy and the decline in disposable income.

Visitation is unevenly distributed throughout the year, with the highest visitation occurring during the four major holiday weekends (Halloween, Thanksgiving, New Year's, and Presidents' Day). The visitation estimates for the major holiday weekends often exceed 100,000 visitors. For example, the average visitation during Thanksgiving weekend for fiscal years 2004 through 2009 was 179,677. During approximately 25 percent of the recreation season (i.e., two out of eight months in the season), 35 percent of the annual visitation occurs.

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. These return visits provide a sense of tradition, nostalgia, history, intergenerational bonding, and a sense of place attachment.

The Planning Area is open to the public year-round. However, due to high temperatures during the summer months, the recreation season is generally 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 is considered by BLM to be May 31.

The demand for recreation opportunities peaks on approximately 12.5 percent of the recreation season (October 1 to May 31; Figure 3.1).

The peak use 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. This change is consistent with the Planning Area's unique and valued niche of providing a wide spectrum of recreation opportunities.

3.15.7 Management Practices

A variety of practices can be used to manage recreation resources at the SRMA. The BLM has a program that monitors natural, cultural, and recreational resources. The BLM monitors sensitive plants, animals, and habitats throughout the open and closed areas in the dunes. Transects are walked and driven to record plant and animal densities, and hidden automatic cameras are used to photograph animals using water sources in the dunes. Visitor use is monitored through newly installed traffic counters, and has been done in the past with aerial flights during the weekends. The BLM also conducts visitor surveys, in cooperation with special interest groups, to inventory visitor satisfaction and needs. Using these inventories, BLM managers estimate how well they are meeting national, state, and local goals and adjust actions accordingly.

3.15.8 Historical Trends

Although it is believed that the fluctuation in the economy can cause yearly fluctuations in visitation, the level of visitation has increased over time. Between 1980 and 2001 there was an increase of 108 percent of the registered OHV in California. Between 1994 and 2001 there was an increase of 74 percent of street licensed 4-wheel drive vehicles. Between 1980 and 2000 there has been a 48 percent decrease in the acreage available for OHV recreation (California State Parks 2002). Many of the other major dune recreation areas in the CDCA have been closed to motorized recreation. Only Dumont Dunes and the ISD SRMA remain open to OHV recreation. Within the Planning Area, 25,843 acres (12 percent) of BLM-administered lands have been closed to OHVs as congressionally designated wilderness. The former WSA 362 (central dunes) has been released from further wilderness study.

Later model OHVs are much more technologically advanced than the old standard OHVs. OHVs are more powerful, and have better suspension and traction. This has led to faster and more reliable vehicles. The types of OHVs have also diversified. It is not unusual to see standard dune buggies, long travel dune buggies, motorcycles, all-terrain vehicles, all-terrain cycles, golf carts, side-by-sides, 4-wheel drives, and custom vehicles only limited by the imagination of the builder. Many of the new OHVs will cost as much as \$100,000 or more.

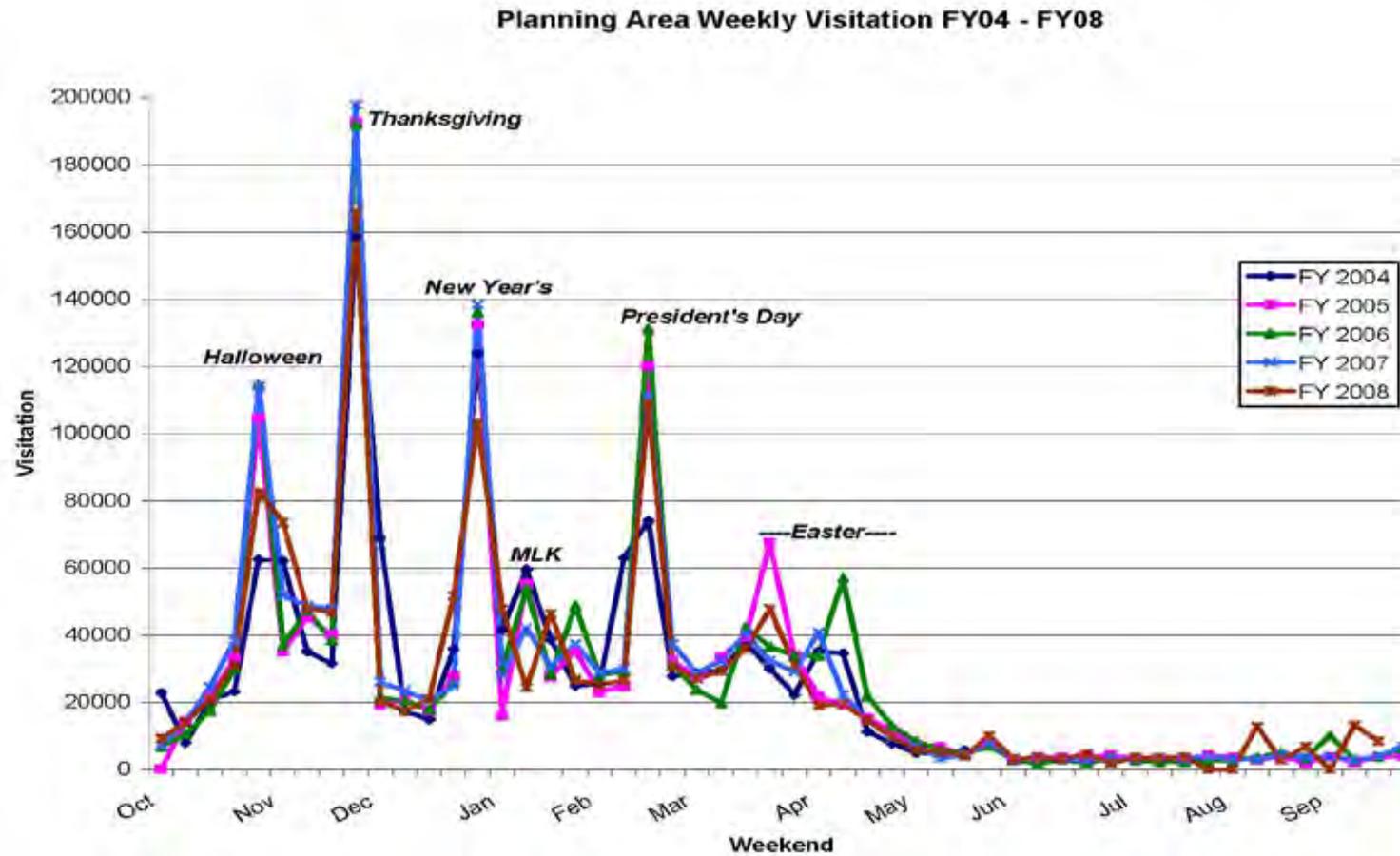


Figure 3.1 This graph illustrates the extreme peaks in visitation. These data were collected through vehicle counters located at Gecko Road, Osborne, Glamis off-ramp, Wash Road, Ogilby camp area, Gordons Well, and Grays Well. The vehicle counts were taken every Monday morning and multiplied by 3.5 to extrapolate the visitor count (BLM 2009b).

OHV enthusiasts are also using more technological equipment as part of their recreational experience. Many enthusiasts are using global positioning systems to navigate through and around the sand dunes. The use of cellular phones has also helped in circumstances when a person is lost, injured, or stranded due to mechanical malfunction.

Camping units have increased in size. Current motor homes and trailers are as long as a semi-truck and much wider. The invention of the “slide out” can make a parked unit up to 15 feet wide. OHV trailers come as enclosed two-story units to increase the capacity of OHVs. New motor homes and trailers have all the comforts of home including satellite dish TV, refrigerator and freezer, microwave ovens, desktop or laptop computers, and telephones. These conveniences make it easier for the visitors to have an extended stay. Although there are many visitors who still “rough it” in a tent and a pick-up truck, many of the visitors will also have over \$100,000 invested in their OHV, trailer, and camping unit.

3.16 Transportation and Public Access

Management of public access and transportation on public lands is a vital task for BLM. For the ISD Planning area, transportation and public access are integral to much of the recreational use of the area. Because transportation and vehicle use play such a key role for recreation, management of OHV use is described in this section rather than in Section 3.15, Recreation Management.

The authorities for the BLM to manage transportation and public access to and on the public lands include but are not limited to:

- FLPMA of 1976 (43 USC 1701 et seq.)
- ESA (16 USC 1531 et seq.)
- Executive Order 11644
- Executive Order 11989
- 43 CFR 8342
- National Management Strategy Motorized Off-highway Vehicle Use on Public Lands (2001)
- National Mountain Bicycle Strategic Action Plan (2002)

Transportation and public access refers to the physical ability of the public, agency personnel, and authorized users to reach and travel on public lands. This section

describes the transportation network within the Planning Area, including county, state, and federal roads and highways, but focuses on routes crossing public lands over which BLM has authority. This section also includes discussion of OHV area designations, which are important for transportation management. Maps 2-19 and 2-27 show the existing OHV area designations and routes of travel for the Planning Area. Routes are identified as motorized and non-motorized.

3.16.1 Motorized Vehicle Access

The transportation network and OHV area designations for the Planning Area were developed as part of the CDCA Plan and plan amendments since 1980. These designations followed the MUC guidelines and further guidance found in the Motorized Vehicle Access Element of the CDCA Plan. Under the CDCA Plan, motorized vehicle use is allowed based on the MUC designations. Compliance with EOs 11644 and 11989 and 43 CFR 8342.1 was followed for all classes. The CDCA guidelines for vehicle access are:

- MUC C (Controlled Use/Wilderness). Motorized vehicle use is generally not allowed unless provided for in individual wilderness legislation and management plans, or if necessary to serve valid existing rights and for emergency use for public safety, or protection of wilderness values.
- MUC L (Limited Use). New roads and ways may be developed under right-of-way grants or pursuant to regulations or approved plans of operation. Motorized vehicle use is allowed on approved routes of travel. This means that existing routes of travel are closed unless specifically designated open. Vehicle use on some major dunes and dry lakebeds may be allowed. Periodic or seasonal closure of routes of travel may be required.
- MUC M (Moderate Use). Motorized vehicle use will be allowed on existing routes of travel unless designated closed by the authorized officer. New routes may be allowed upon approval of the authorized officer. Vehicle use on some major dunes and dry lakebeds may be allowed. Periodic or seasonal closure of routes of travel may be required.
- MUC I (Intensive Use). Same as Class M. In addition, the vehicle open areas are available for unrestricted vehicle access. Vehicle use on some major dunes and dry lakebeds may be allowed. Periodic or seasonal closure of routes of travel may be required.

The transportation network was intended to improve opportunities for recreational use in the CDCA while protecting sensitive resource values and resolving conflicts among users. Changes to these designations have occurred over time and through plan amendments, primarily to minimize impacts to sensitive plant, animal, and cultural

resources. Examples of minimization actions include designations of ACECs and wildlife management areas with additional travel restrictions, reductions of routes, and monitoring of effectiveness. Plan amendments that have occurred in the Planning Area to address OHV use and minimization of impacts to resources include the NECO (2002) and the WECO (2003) plans. These plan amendments apply to the approximately one-mile-wide planning area surrounding the ISD SRMA.

In addition, there are federal, state, and county routes and ROWs within the Planning Area. BLM will not make decisions regarding these roads or ROWs in this plan.

The following routes shown in Table 3-18 provide motorized vehicle access to the Planning Area.

**TABLE 3-18
MOTORIZED VEHICLE
ACCESS TO THE
PLANNING AREA**

BLM Routes of Travel
Luis Aguilar Road
Gecko Road
Grays Well Road
Wash Road
State and Federal Highways
Interstate 8
State Route 78
County Roads
Sidewinder Road
Walker Way
Niland–Glamis Road
Ogilby Road (S-34)
Ted Kipf Road
Vista Mine Road

The two major road ROWs (SR-78 and I-8) that cross the recreation area in an east–west direction provide primary access to the Planning Area. Ogilby Road is an Imperial County road (S-34) linking SR-78 and I-8 along the eastern edge of the Planning Area.

3.16.1.1 Designation Criteria

The following criteria were used to develop the alternatives for the designation of OHV areas and routes in the Planning Area. See Chapter 2, sections 2.3.16.1 and 2.3.16.2. These designation criteria (also known as minimization criteria) are found in 43 CFR 8342.1.

- (a) Areas and trails shall be located to minimize damage to soil, watershed, vegetation, air, or other resources of the public lands and to prevent impairment of wilderness suitability.
- (b) Areas and trails shall be located to minimize harassment of wildlife or significant disruption of wildlife habitats. Special attention will be given to protect endangered or threatened species and their habitats.
- (c) Areas and trails shall be located to minimize conflicts between off-road vehicle use and other existing or proposed recreational uses of the same or neighboring public lands and to ensure the compatibility of such uses with existing conditions in populated areas, taking into account noise and other factors.
- (d) Areas and trails shall not be located in officially designated wilderness areas or primitive areas. Areas and trails shall be located in natural areas only if the authorized officer determines that off-road vehicle use in such locations will not adversely affect their natural, esthetic, scenic, or other values for which such areas are established.

3.16.2 Non-motorized Vehicle Access

Motorized vehicle travel is prohibited within the 26,098 acres that comprise the North Algodones Dunes Wilderness. Motorized vehicle access is also prohibited in the 3,800-acre Administrative Closure immediately north of the wilderness, in the 2,000-acre Administrative Closure in the Gecko area, in the 43,035-acre large, central Administrative Closure and the 310-acre Administrative Closure immediately to the south, and the 160-acre Administrative Closure in the Buttercup area. Use of motorized vehicles in closed areas may be authorized for law enforcement, fire suppression, search and rescue, or other emergency or management actions as deemed necessary by the authorized official.

3.16.3 Traffic Study

Traffic volumes on major access roadways in the vicinity of the Planning Area are presented in Table 3-19 (BLM 2003b). These traffic volumes include both commercial traffic through the Planning Area and traffic by the visitors accessing the ISD Recreation Area. The heaviest traveled segment of roadway is on I-8 west of Sidewinder Road. This segment has an Average Annual Daily Traffic 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 Planning Area is also summarized in Table 3-19 below.

**TABLE 3-19
PLANNING AREA TRAFFIC VOLUMES (2000)**

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=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%

¹HCM: Highway Capacity Manual, Transportation Research Board, National Research Council

v/c: Volume over capacity ratio

The LOS is a measure of the quality of traffic operations based on selected factors of the type of roadway. LOS categories 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 published by Transportation Research Board of the National Research Council (2000).

The I-8 freeway is operating at LOS B in the vicinity of the Planning Area. It is based on the 55-mile-per-hour free-flow speed and the Highway Capacity Manual density flow rate chart for basic freeway segments. The LOS on SR-78 varies from A to C, based on Highway Capacity Manual LOS chart for a two-lane highway on rolling terrain and the assumption that no passing zones comprise 80 percent of the routes. The remaining roadways are operating at LOS C or better.

3.17 Lands and Realty

BLM manages a diverse combination of land and resources in the Planning Area, including land use for utility corridors, communication sites, land tenure issues, land use authorizations, withdrawals, and renewable energy.

3.17.1 Utility Corridors and Communications

Map 2-28 shows the location of the utility corridor and communications sites.

3.17.1.1 Utility Corridors

A major utility corridor within the recreation area passes through the Buttercup Valley Open Area parallel to I-8 (see Map 2-28). 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 ROW, and a microwave relay tower is located west of Ogilby.

3.17.1.2 Communication Sites

Communication sites are issued as ROWs or as communication use leases under FLPMA, as per 43 CFR 2800 and 2920. There are three communication sites within the Planning Area: Dunes Vista, Dunebuggy Flats, and Ogilby (see Map 2-28). The communication site at Dunes Vista is located in the southeast portion of the Planning Area at the intersection of Ogilby Road and I-8. The communication site at Dune Buggy Flats is located in the southwestern portion of the Planning Area, just north of I-8 and just west of the Coachella Canal. There are also small BLM-operated sites (Cahuilla Ranger Station and Dune Buggy Flats) that provide communication for BLM staff throughout the Planning Area. Commercial entities use a portion of the sites for cellular usage, and radio and TV signals. Some city and county governments also have facilities to support their communication needs. Other federal government agencies (e.g., USBP and the military) use communication sites in the Planning Area that are not identified in this document.

3.17.2 Land Tenure

3.17.2.1 Acquisitions

The lands and realty program primarily assists in the acquisition of easements to provide for legal access where other programs have identified a need. Access refers to the physical ability and legal right of the public, agency personnel, and authorized users to reach public lands. BLM will comply with all deed restrictions on all acquisitions.

Land acquisitions are considered on a case-by-case basis through exchange, purchase, donation, or eminent domain. Acquisition of easements, for purposes such as access or conservation, is also considered on a case-by-case basis. Decisions to acquire lands would be based on public benefits, management considerations, and public access needs.

Donated lands within the Planning Area include lands quitclaimed to the United States by the State Lands Commission through a land exchange with the BLM, lands purchased with Land and Water Conservation Funds, and lands donated by The Wildlands Conservancy (Map 3-9). These lands were donated to preserve the natural resources within these areas.

Donated lands are not automatically withdrawn from operation of the public lands laws. Any applications for use are evaluated in light of current BLM management, and the proposed use can be subject to environmental review.

3.17.2.1.1 Ongoing Land Acquisition Project

The BLM is actively acquiring flat-tailed horned lizard habitat as mitigation for impacts to habitat resulting from several projects including the Arizona State Highway project, Drop 2 Water Reservoir, All-American Canal lining, among others. Compensation monies are being used to make the purchases of lands from willing sellers. Sections of land, or portions thereof, in various stages of the acquisition process lie within the boundary of the Planning Area.

3.17.2.2 Land Status and Jurisdiction

Land ownership within the Planning Area is composed of federal, state, and private. The public lands within the Planning Area come under the jurisdiction of the BLM El Centro Field Office, located in El Centro, California.

Privately-owned lands that occur in the Planning Area include a few agricultural and rural home sites which are intermingled throughout.

3.17.2.3 Public/Private Interface

Generally, the Planning Area does not have a public/private land interface problem. There are situations throughout the area in which public and private lands intermingle and create property boundaries which do not conform to logical natural topographic features. This occasionally complicates management of activities and resources.

3.17.2.4 Land Tenure Adjustment

Land tenure (or land ownership) adjustment refers to those actions that result in the disposal of BLM lands or the acquisition of nonfederal lands or interests. There are currently no BLM-administered lands available for disposal. Acquisitions of non-federal land parcels are considered on a case-by-case basis through exchange, purchase, donation, or eminent domain.

On July 25, 2000, the FLTFA, referred to as the Baca Bill, became Public Law 106-248. The Baca Bill allows BLM to utilize funds from land sales and exchange equalization payments to acquire lands, if such acquisition is found to be in the public interest. Prior to the Baca Bill, receipts from land sales went primarily to the U.S. Treasury and were not available to BLM. To meet the criteria for disposal under the Baca Bill, public lands must have been identified for disposal through a management plan approved prior to July 25, 2000, when FLTFA became law. FLTFA expired in 2010, and has not been amended.

3.17.3 Land Use Authorizations

Land use authorizations include various authorizations and agreements to use BLM-administered land, such as ROW grants, leases, and temporary use permits under several different authorities (see Appendix N). BLM analyzes requests for land use authorizations on a case by case basis.

3.17.3.1 Land Use Permits

BLM administers several temporary permits involving less than three acres of land. These permits are issued for a term of up to three years and are for the temporary use of public lands. Film permits are short-term uses and the actual number of permits issued varies monthly. As of 2009, 14 permits had been issued for filming in the Planning Area. There are five (3-year) apiary permits in the Planning Area, which include a total of 35 sites on 8 acres. These permits allow for the annual servicing of bee hives at several sites scattered throughout the Planning Area and can be renewed.

3.17.3.2 Rights-of-way

Existing grants are for a myriad of different facilities and are held by private individuals and groups, as well as by various business and government entities (Appendix O). Roads, power transmission and distribution lines, and telephone lines are the most common facilities to be granted for ROWs. Examples of additional types of ROW facilities include water and gas pipelines, communication sites, ditches, railroads, and fiber optic lines.

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 DOD or the BOR) under FLPMA, the BLM has granted a number of ROWs for facilities within the Planning Area.

As with other BLM-administered lands, ROWs and temporary use permits within the Planning Area 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 ROW is

intended would conflict with a valid pre-existing use. Thus, OHV recreational activities still occur on utility ROWs within the Planning Area. 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 military areas.

Interstate 8 is the major east–west highway and traverses the Planning Area from the southeast and proceeds to the west for about 10.3 miles through the southern portion of the Planning Area. The UPRR runs 40.7 miles along the western portion of the Planning Area.

As previously described, there are major utility ROW corridors presently traversing the Planning Area. The I-8 corridor runs east/west across approximately 10.3 miles of public land near Interstate 8. Another major ROW corridor runs parallel to the I-8 corridor and currently contains one 500-kV transmission line that originates in San Diego and crosses the Colorado River into Arizona, and there are several buried fiber optic networks and telephone lines.

A 39-mile utility corridor and UPRR ROW runs along the eastern boundary of the ISD SRMA. This contingency utility corridor is 2 miles wide and can be brought forward into the CDCA Plan after simultaneous plan amendment and EIS on an identified project.

Revised Statute 2477 (RS 2477)

In 1976, Revised Statute (RS) 2477 was repealed by the FLPMA, 43 USC §1701 et seq. PL No. 94-579 § 706(a), 90 Stat. 2743. FLPMA did not, however, terminate valid rights of way that had been established under RS 2477 prior to its repeal. Instead, Congress specified that any valid RS 2477 ROWs existing as of the date FLPMA was approved (October 21, 1976), would continue in effect.

The most recent Departmental guidance on RS 2477 was issued on March 22, 2006. The guidance document was issued after the 10th Circuit Court of Appeals issued a decision in *Southern Utah Wilderness Alliance v. Bureau of Land Management*, 425 F. 3d 735 (10th Cir. 2005). The Department revoked the previous policy guidance from January 22, 1997 and December 7, 1988. The 2006 Departmental guidance recognizes the jurisdiction of the federal courts to determine the validity of an asserted RS 2477.

RS 2477 is a complex and controversial issue with far-reaching implications for the management of federal lands throughout the West. RS 2477 was enacted in 1866, during a period when the federal government promoted settlement of the West. It was a primary authority under which many state and county highways were constructed over federal lands in the West. By its general wording, "the right-of-way for the construction of highways over public lands, not reserved for public uses, is hereby granted" the act minimized the administrative burden on the federal government to authorize the

construction of each highway across the largely undeveloped lands in the West. While the act accomplished its goal of facilitating development, the general wording and a lack of documentation of RS 2477 rights continue to be sources of disagreement and controversy.

Although FLPMA repealed RS 2477, it did not terminate existing RS 2477 ROWs. Section 701 of FLPMA states that nothing “shall be construed as terminating any valid lease, permit, patent, right-of-way, or other land use authorization existing on the date of approval of this Act.”

Some paved roads, which serve as major transportation routes, have no ROW documented in public land records. Many routes, claimed as RS 2477 ROW, came into existence with no documentation in public land records. National parks, national monuments, national preserves, national forests, national wildlife refuges, national conservation areas, other special areas (e.g., designated wilderness), and military bases were reserved after 1866. Generally, these areas were reserved subject to valid existing rights (rights established before the reservation). Some public lands were conveyed out of federal ownership after 1866, also subject to valid existing rights. Under RS 2477, routes which came into existence after 1866 may be existing rights, but they must have been established: (1) before reservation for a public purpose, withdrawal, patent, mining claim, or transfer out of federal ownership; and (2) before the passage of FLPMA (October 21, 1976). Holders of existing rights retain a right of access associated with those rights without an RS 2477 ROW. However, BLM approval is required prior to driving on any closed route.

BLM decisions about which OHV routes are designated open or limited and which are designated closed are based on resource management concerns and legal mandates (such as in designated wilderness) in a process called “route designation.” OHV routes will be designated during this planning process as implementation actions, in conformance with the plan decisions which designate areas open, closed or limited.

A route designated “open” does not mean that BLM believes the route to be an RS 2477 ROW. Conversely, a route designated as closed does not reflect a belief that an RS 2477 ROW does not exist. The closure of a route does not modify or extinguish any RS 2477 ROW that may exist. Holders of other valid ROWs or other valid existing rights, retain a right of access without an RS 2477 ROW. However, BLM approval is required before driving on any closed route. Closed routes outside wilderness will remain closed until RS 2477 assertions are processed or until the routes are opened using the route designation process.

3.17.3.3 Realty Trespass

Realty trespass—specifically unauthorized occupancy, use, and development—is not a significant problem in the Planning Area. Unauthorized occupancies are typically

encroachments of buildings or yards onto public land and have usually existed for many years. These situations are most often discovered in the course of surveying projects. Unauthorized ROW situations generally involve negligence. Resolution of such situations depend upon individual circumstances and may include issuance of temporary land use permits, leases or ROWs, disposal of the land either by sale or exchange, or removal of the unauthorized use.

3.17.4 Withdrawals

The existing withdrawals in the Planning Area are described below and illustrated on Map 3-10.

The BOR retains a withdrawal on the ROWs of the New Coachella Canal and All-American Canal (1,000 feet on either side of the canal centerline). The BOR must approve BLM management programs initiated within the canal ROWs. The paramount use on all BOR-withdrawn lands is BOR programs.

The 1994 CDPA designated the North Algodones Dunes Wilderness within the Planning Area, withdrawing it from all forms of land entry.

3.17.5 Renewable Energy

As demand has increased for clean and viable energy to power the nation, consideration of renewable energy sources available on public lands has come to the forefront of land management planning. Renewable energy includes solar power, wind, biomass, and geothermal resources. Only solar and wind energy potential will be discussed below. See Section 3.14.3—Mineral Resources for further discussion of geothermal resources.

In cooperation with the National Renewable Energy Laboratory (NREL), an agency of the Department of Energy (DOE) has developed a Renewable Resource Assessment Project. The findings of this project are contained in a 2003 report entitled, *Assessing the Potential for Renewable Energy on Public Lands*. The report identified criteria that are considered in establishing potentials for various types of renewable energy. It also identifies the top 25 BLM Planning Units with the largest total land area of high-potential concentrating solar power sites with solar resources of 6 kWh/m²/day or greater. The Planning Area was included among this top 25 (Map 3-11).

To date, there are no solar energy projects within the Planning Area. There have been numerous inquiries regarding the development of solar energy on BLM-administered lands within the Planning Area, and one application adjacent to the Planning Area would extend 322 acres into the Planning Area. The application has since been withdrawn by the applicant. Solar potential is likely largely discounted due to lack of large open flat spaces, topography, and/or excluded areas due to critical habitat, and VRM classes.

Demand for renewable energy development is expected to increase over the planning period, and management actions are necessary to provide for future renewable energy growth while protecting sensitive resource values.

Renewable energy potential on public lands was researched and presented in *Assessing the Potential for Renewable Energy on Public Lands* by BLM and U.S. Department of Energy, Energy Efficiency, and Renewable Energy (2003). This assessment analyzed the potential for wind energy (and other renewable energy) development on public lands in the western United States. The most important screening criteria used in developing the model for wind energy potential consisted of the following:

- Wind resource is wind power Class 4 and above for short term, Class 3 and above for long term.
- Federal, state, and local policies support wind energy.
- Transmission access is within 25 miles (69–345 kV) and transmission capacity is available.
- Site must be compatible with wind energy development; scenic areas, view-sheds, and non-development regions must be eliminated.
- Site must have access to roads within 50 miles.

A few additional items were also reviewed but not given the same weight as the above criteria. Based on this analysis, there is little potential to support wind energy on BLM-administered lands in the Planning Area (Map 3-12). No areas within the Planning Area have been identified by NREL as having a moderate to high potential for wind resources.

3.18 Public Health and Safety

3.18.1 Hazardous Materials and Public Health

This section evaluates the storage and use of hazardous materials and the disposal of non-hazardous and hazardous waste within the Planning Area. In addition, the results from a search of applicable federal and State of California environmental databases are provided to give a better understanding of the hazardous materials used and disposed of near the Planning Area. Existing effects to human health and the environment are discussed to provide a baseline from which the proposed project alternatives can be analyzed.

3.18.1.1 Current and Past Uses of Adjoining Property

Land uses proximate or adjacent to the Planning Area include a number of non-recreation applications. These land uses include BOR-withdrawn lands, military target areas, sand and gravel sales activities, geothermal leases, mining, and utility transportation ROWs. Although certain of these land uses have an undetermined 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.

3.18.1.2 Hazardous Materials Management

Hazardous materials within the Planning Area consist of materials within municipal and informal dumping sites, and mining-related hazardous materials. Each is described in more detail below.

3.18.1.2.1 Landfills

Operational, closed, and informal landfills have the potential to cause environmental impacts to BLM-administered land. Chemical leachate from landfills has the potential to contaminate soil and reach surface water or groundwater. Local law enforcement is responsible for enforcing laws and regulations that prohibit illegal dumping in landfills found on lands that are not managed by BLM. The only known landfill near BLM-administered lands within the Planning Area is the Mesquite Regional Landfill. The Mesquite Regional Landfill is permitted to receive 20,000 tons per day of nonhazardous (Class III) municipal solid waste by rail from Southern California counties. Of that amount, the site is permitted to receive up to 4,000 tons per day by truck. The landfill is located on 4,250 acres next to the Mesquite Gold Mine, 5 miles northeast of Glamis on SR-78 near the UPRR.

3.18.1.2.2 Mining and Milling Waste

Hazardous mining waste consists of mineralized waste rock, ore stockpiles, and mill tailings. Metallic minerals that occur in the rock have the potential to contaminate soil and water down gradient of the mining waste. Mill tailings may contain traces of metals as well as other chemical constituents, such as acids. Further, mine workings and mine dumps containing sulfide mineralization can create acid mine drainage when exposed to oxygen and water. The potential for this type of hazardous material occurs at abandoned mines on and adjacent to BLM-administered land. Abandoned mines and associated features and structures, if 50 years old or older, are considered potential historic resources and are subject to provisions of the NHPA and other heritage preservation mandates. There are no known abandoned mines in the Planning Area.

3.18.1.3 Environmental Database Results

A review of available environmental records was performed to determine and identify known hazards associated in the Planning Area and adjacent properties. An electronic database report was obtained from Fidelity Information Services, prepared in accordance with the American Society for Testing and Materials practices, which include all reasonably ascertainable environmental records including state and federal sources. Appendix P contains a brief summary of each database searched that resulted in known sites within or near the Planning Area. No sites of environmental significance were identified.

3.18.1.4 Unexploded Ordnance

Although there are no known occurrences within the Planning Area, which is a formerly used defense site, there is a low potential for UXOs on public lands to be present as a result of ongoing military maneuvers. Given the amount of aircraft used on the various military facilities in the Planning Area, there is a low possibility that a military aircraft could crash and be a source of UXO.

3.18.2 Noise

3.18.2.1 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 (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.

3.18.2.2 Existing Noise Environment

The Planning Area 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 Planning Area. The town of Brawley is located to the west, and Mexico is located to the south. Recreational activities that occur within the Planning Area include OHV recreation, camping, hiking, and flora/fauna observation.

Natural deserts do not exceed 66 decibels, and no desert animal creates sounds above 56 decibels. Mechanized sounds increase the decibel level in the desert. A motorcycle's sound ranges from 40 to 100 decibels. Within 100 meters, the peak decibels created by a motorcycle exceed those of naturally occurring sounds (Table 3-20).

**TABLE 3-20
AVERAGE NOISE LEVELS OF COMMON OUTDOOR NOISE SOURCES
IN THE PLANNING AREA**

Activity	Noise Level (dBA)
Ambient Noise in Remote Area	35–50
Bird Calls	44
Recreational Vehicle Generator	55–60
Passenger Vehicle (65 mph at 25 feet)	77
Music (radio or stereo)	76 (average)
Freeway (at 50 feet from pavement edge)	76
Diesel Train (45 mph at 100 feet)	83
Diesel Truck (40 mph at 50 feet)	84
OHV (at about 25 feet, average noise level)	80–90 (depending on model and stroke)
Motorcycle (at 25 feet)	90
Jet Aircraft (at 1 mile)	97

Ambient noise level measurements for the Planning Area are not available. Ambient noise levels in the Planning 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 Planning Area and vicinity, including:

- Noise from train movements on the UPRR tracks located along the east side of the Planning Area
- Noise associated with occasional recreational and support activities, especially both concentrated and dispersed OHV recreation within the Planning Area and the immediate vicinity
- Vehicular traffic noise on major roadways leading to the Planning Area
- Intermittent military aircraft maneuvers and military weapons explosions associated with the use of the Chocolate Mountain Aerial Gunnery Range located to the northwest of the Planning Area and a gunnery range north of East Mesa
- Occasional military aircraft overflights associated with flight corridors located above and adjacent to the Planning Area
- Military helicopter use of the Planning Area as a training ground for the use of night vision devices
- USBP helicopter use of the Planning Area as a part of apprehending undocumented immigrants and smugglers

- Private air ambulance service as a part of providing medical aid to visitors
- Mineral exploration, including drilling by Glamis Imperial under existing BLM approvals
- Natural sources such as wind, rain, thunder, and wildlife

3.18.2.2.1 OHV Noise Levels

The primary noise sources in the Planning Area are OHV activities and vehicular traffic on local roads. The noise levels from OHV recreation 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 (a) 92 dBA for any such vehicle manufactured before January 1, 1973; (b) 88 dBA for any such vehicle manufactured on or after January 1, 1973, and before January 1, 1975; (c) 86 dBA for any such vehicle manufactured on or after January 1, 1975, and before January 1, 1986; and (d) 82 dBA for any such vehicle manufactured on or after January 1, 1986. According to data from the *California Off-Highway Vehicle Noise Study*, even with mufflers, noise levels from OHVs were found to be in the range of 80 to 95 dBA per unit at a distance of 20 inches (Wyle Laboratories 2005). A noise level of 95 dBA at 20 inches is estimated to attenuate to a level of approximately 75 dBA at a distance of 50 feet.

The level of OHV activities in or near the Planning Area varies throughout the year, with little, if any, OHV recreation and noise during the summer months. Virtually all OHV recreation in the Planning Area occurs from mid-October to May, with approximately 35 percent of total annual OHV recreation occurring on the following four holidays/weekends: Halloween, Thanksgiving, New Year's, and Presidents' Day. During these high-use weekends, OHV-related noise levels can be relatively high within certain areas of the Planning Area. The remaining 65 percent of annual OHV recreation occurs primarily on other weekends throughout the October–May period. Therefore, background OHV noise levels in and around the Planning Area range from low (during weekdays) to moderate during moderate-use weekends and high during the four high-use weekends.

3.18.2.3 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 Planning Area is situated in a very remote area, there are no such typical sensitive human receptors in or anywhere near the Planning Area. The Cahuilla and Buttercup Ranger Stations are located within the Planning Area, but they are not sensitive receptors since they are considered part of the administration of the Planning Area.

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 Planning Area). The town of Brawley is located farther west, approximately 25 miles to the west of the Planning Area.

3.18.3 Law Enforcement and Public Safety

The U.S. Congress recognized that law enforcement on BLM-managed public lands was needed to encourage public safety and to protect resources. In 1976, BLM was given law enforcement authority with the passage of FLPMA. As such, BLM law enforcement officers are responsible for promoting public safety and protecting resources within the 264 million acres of BLM-managed public land in the United States. These law enforcement goals are accomplished in partnership with other federal, state, and local law enforcement agencies. BLM law enforcement officers patrol the Planning Area 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 issuing warnings and citations, and making arrests. These officers enforce both state and federal regulations in the Planning Area.

3.18.3.1 Recorded Incidents

3.18.3.1.1 Emergency Response—Medical Aid and Fatalities

During the 2007–2008 visitor season, approximately 609 incidents requiring medical aid occurred during the entire season, with 380 incidents over the four major holiday weekends. Table 3-21 lists a summary of documented medical aid responses and fatalities over the period of 2004 to 2008.

**TABLE 3-21
DOCUMENTED MEDICAL AID RESPONSES AND FATALITIES WITHIN
THE PLANNING AREA, FY2004–FY2008**

Fiscal Year	Medical Aid Responses	Fatalities
FY2004	676	6
FY2005	687	9
FY2006	756	13
FY2007	737	14
FY2008	609	13

Note: Not all medical aid responses and fatalities are OHV-related. Some incidents did not occur on BLM-managed lands. Because the BLM assisted the County due to its proximity to the incident, BLM included these responses in the statistics.

BLM Unpublished data

3.18.3.1.2 Citations and Arrests

During the 2007–2008 visitor season, 4,673 citations/arrests occurred over the four major holiday weekends. On average, this represents approximately 1,168 citations and/or arrests per major holiday weekend (BLM unpublished data, 2009). Law enforcement incidents occur throughout the Planning Area, but are generally concentrated around campgrounds and meeting places, as well as access points.

Violation notices tracked by BLM EI Centro include the following categories: registration, minor in possession, no helmet, double riding, no lights, resisting arrest, 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, creating a hazard, litter, and concealed (loaded) firearm. Arrests tracked by BLM EI Centro include the following categories: driving under the influence, assault, felony evade, warrant, drugs, explosive device, inciting riot, false information, auto theft, possession of stolen property, and interference. Table 3-22 provides a summary of violation notices (citations) that BLM EI Centro issued during fiscal years 2004-2008, while Table 3-23 provides a summary of arrests that BLM EI Centro issued during fiscal years 2004–2008.

**TABLE 3-22
TOTAL CITATIONS WITHIN THE PLANNING
AREA, FY2004–FY2008**

Fiscal Year	Number of Citations¹
FY2004	2,170
FY2005	2,308
FY2006	1,447
FY2007	2,725
FY2008	4,555

¹Records do not include Martin Luther King Jr. or Easter holiday weekends. BLM does not currently consider the Martin Luther King and Easter holiday weekends as major visitation incidents due to the low levels of visitation. Although the incident command system is not typically implemented during these weekends, adequate personnel is provided for visitor safety and resource protection. Since these weekends are not managed under the incident command system, arrest and citation data are not compiled.

Source: BLM Unpublished data

**TABLE 3-23
TOTAL ARRESTS WITHIN THE PLANNING
AREA, FY2004–FY2008**

Fiscal Year	Number of Arrests¹
FY2004	102
FY2005	75
FY2006	111
FY2007	51
FY2008	118

¹Records do not include Martin Luther King Jr. or Easter holiday weekends. BLM does not currently consider the Martin Luther King and Easter holiday weekends as major visitation incidents due to the low levels of visitation. Although the incident command system is not typically implemented during these weekends, adequate personnel is provided for visitor safety and resource protection. Since these weekends are not managed under the incident command system, arrest and citation data are not compiled.

Source: BLM Unpublished data

3.18.3.2 Law Enforcement Personnel

The El Centro Field Office has a staff of 12 delegated law enforcement officers (one Chief, two Supervisors, and nine Rangers) who conduct regular patrols of the Planning Area. Various vehicles (e.g., 4x4s, all-terrain vehicles, side-by-sides, 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 units, visitors are starting to venture further into the inner dunes (BLM 2001d).

Additional staffing resources include BLM staff from other offices, as well as other federal and state agencies including National Park Service, USFWS, USBP, U.S. Forest Service, State Parks, California Highway Patrol, Imperial County Sheriff's Department, Imperial City Police Department, Brawley Police Department, El Centro Police Department, Calipatria Police Department, and Calexico Police Department. These additional resources are typically brought in over four of the six major holiday weekends (Table 3-24). 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 law enforcement officers can arrive. The Imperial County Sheriff's Department and BLM currently co-lead law enforcement activities for major holiday weekends. The Imperial County Sheriff's Department provides an average of 20 officers on holiday weekends and several deputies on non-holiday weekends.

**TABLE 3-24
BLM RANGERS AND ADDITIONAL LAW ENFORCEMENT OFFICERS BY
MAJOR HOLIDAY WEEKEND, FY2004–FY2008**

Major Holiday Weekend¹	FY2004	FY2005	FY2006	FY2007	FY2008
Halloween	38	n.d.	78	48	45
Thanksgiving	35	31	58	46	62
New Year's Eve/Day	43	41	42	n.d.	66
Presidents' Day	67	55	60	54	n.d.
Total	183	127	238	148	173

¹Records do not include Martin Luther King or Easter holiday weekends. BLM does not currently consider the Martin Luther King and Easter holiday weekends as major visitation incidents due to the low levels of visitation. Although incident command system is not typically implemented during these weekends, adequate personnel is provided for visitor safety and resource protection. Since these weekends are not managed under the incident command system, arrest and citation data are not compiled.

n.d. = no data

Source: BLM Unpublished data

El Centro law enforcement personnel determine the number of officers needed for each holiday weekend to provide services for the Planning Area based on the estimated visitor supply. They then coordinate with other agencies to arrange for the officers.

3.18.3.3 Public Safety Facilities and Equipment

The BLM has two permanent ranger stations within the Planning Area. Cahuilla Ranger Station is located on Gecko Road, within the most heavily visited area. Buttercup Ranger Station is located immediately south of I-8 in the Buttercup area. Both Ranger Stations are open approximately 14 hours each day during holiday periods (approximately 20 days per year). On non-holiday weekends, the ranger stations are open approximately eight hours per day.

Additionally, during holiday weekends, one temporary contact station is set up in the Dune Buggy Flats area. Law enforcement shares facilities with the park rangers; there is no specific area reserved only for law enforcement use.

The closest hospital to the North Dunes area is Pioneer Memorial, located in Brawley, California, approximately 20 miles from the Planning Area. The closest hospitals to the South Dunes area are Yuma Regional in Yuma, Arizona, located approximately 25 miles from the Planning Area and El Centro Regional Medical Center in El Centro, California, located approximately 40 miles from the Planning Area.

3.18.3.4 Border Issues

The Planning Area has extensive undocumented immigration and other U.S.–Mexico border health and safety issues with Mexico, including transient populations and illegal dumping activities. USBP is called upon to rescue numerous undocumented immigrants who attempt to cross rugged, desert terrain without being properly prepared. Numerous deaths have occurred, although most of them are in the desert east of the Planning Area. Occasionally, undocumented immigrants and/or those transporting them drive in a very reckless way endangering other motorists and pedestrians. Illegal drugs are also smuggled over the U.S.–Mexico border and some of this takes place in the Planning Area as well. While there is a public perception that the border area is somewhat unsafe, USBP has put great effort into making border areas safer through the construction of tactical infrastructure, installation of cameras that monitor the border area, and increased agent patrols. USBP has completed its tactical infrastructure across the Planning Area, and border issues have significantly decreased. BLM is part of the Border Management Task Force with USBP and meets monthly to address all issues related to border management and safety. In conjunction with resource issues, these public health and safety issues create challenging management decisions for the BLM and cooperating agencies.

An International Boundary Reservation established by the Presidential Proclamation of May 27, 1907, restricts use within sixty feet of the international boundary between the United States of America and the United Mexican States, within the State of California and the Territories of Arizona and New Mexico. The Proclamation reserves all public lands within this 60-foot wide strip, from entry, settlement or other form of appropriation under the public land laws. This area is to be kept free from obstruction as a protection against smuggling between the United States and Mexico. This reservation affects approximately 11.5 miles of BLM-administered public lands within the Planning Area, roughly 83 acres.

3.19 Social and Economic Setting

The BLM-administered lands in the Planning Area are distributed across the eastern portion of Imperial County, California. This section focuses on the demographics and social trends of Imperial County and nine other counties within Arizona and California surrounding or in the vicinity of the Planning Area. In addition, the following individuals and groups will be discussed: OHV recreational users, environmental advocacy groups, vendors, OHV-related business owners, and local communities.

The economic analysis for the Planning Area is divided in two geographic areas. The Economic Impact Area (EIA) is defined as the three counties of Imperial, Yuma, and La Paz in which 90 percent or more of the spending impacts of the Planning Area visitors

would be felt: The Market Demand Area (MDA) is defined as the 10 counties that generate more than 90 percent of all visitors to the Planning Area. The 10-county MDA includes the three EIA counties of (1) Imperial, (2) Yuma, and (3) La Paz plus: (4) Los Angeles, (5) San Bernardino, (6) Riverside, (7) Orange, (8) San Diego, (9) Maricopa, (10) and Pima.

3.19.1 Social/Cultural/Economic History

The ISD has played a significant role in shaping the human history of the Colorado Desert. Located west of the Lower Colorado River, the sand dunes are a unique landscape in southern California and northeast Baja California. The sand dunes are within or near the traditional lands of the Cahuilla, Chemehuevi, Cocopah, Kamia, Kumeyaay, Mohave, and Quechan. Only the Quechan and Kamia visited the area with any regularity, since the sand dunes formed the boundary between these tribes. No tribes had settlements within the Planning Area (Russell et al. 2002; Underwood and Cleland 2002).

The sand dunes figured in the spirit life and origin accounts of the Mojave, Kamia, and Quechan and are considered spiritually significant (Russell et al. 2002). The Native American tribes in the region also had important travel corridors through the Planning Area in prehistoric times, and these general routes are now followed by I-8 and SR-78. The Planning Area may contain spiritually and politically significant human remains (Russell et al. 2002), but none have been discovered or documented (Underwood and Cleland 2002) to date.

Prehistorically, the dunes provided a variety of resources, such as plants and small game for food and plants for medicinal purposes, basketry, and other crafts. These resources were also available in more accessible places near habitations, and the archaeological record suggests that the sand dunes were not visited a great deal (Underwood and Cleland 2002)

In early historic times, the sand dunes were viewed as a significant travel barrier. Spanish explorers, such as Anza and Garcés, avoided the ISD by passing south along the Alamo River. Similarly, American forty-niners and other pioneers moving west along the southern emigrant trail went south of the ISD. Thus, the trail dropped south of the U.S.–Mexico border to avoid the sand dunes. The ISD were also a problem for the Southern Pacific Railroad line being built from Los Angeles to Yuma in 1877. The railroad avoided the sand dunes by laying tracks east through Mammoth Wash, north of the sand dunes. In the twentieth century, the ISD continued to be an impediment to travel. The eminent auto enthusiast Colonel Ed Fletcher built a one-lane, two-track plank road in 1915 to link San Diego with Yuma. Because of design and maintenance problems, a heavier, fully planked, one-lane version was built in 1916. Despite maintenance problems, that version of the Plank Road remained in service until 1926,

when it was replaced by a two-lane asphalt road. The Plank Road was determined NRHP-eligible in 1986 and nominated for inclusion in 2001. It was designated by the BLM as an ACEC in 1985. The Plank Road followed an Indian trail through Buttercup Pass and today the same general route is taken by I-8.

Dr. Oliver Wozencraft, a prominent forty-niner, first conceived the idea of developing the Salton Sink by bringing in water from the Colorado River in 1856. He worked for the next 40 years on the project, but was unsuccessful. In 1896, Charles Rockwood, Anthony H. Heber, and several others formed the California Development Company. Like Wozencraft, Rockwood worked tirelessly to interest the U.S. Congress and financiers in his plans for the creation of a canal to bring Colorado River water to the area now called the Imperial Valley. The company was about to be dissolved in defeat in 1899, when George Chaffee joined the project. Chaffee was founder of the southern California town of Ontario and a world-renowned canal builder with great success in Australia. He was able to attract sufficient support, and by 1900, crews were in the field building a canal from Pilot Knob south around the ISD (Nadeau 1997). In 1901, the Imperial Canal was completed and Imperial Valley gradually became a center of agricultural production. In 1905, the flooding Colorado River broke through the headgate of the canal and soon the entire flow of the river was coursing down the canal. The lower part of Imperial Valley became inundated and eventually was called the Salton Sea. It was not until 1907 that the river was contained; largely through the efforts of the Southern Pacific Railroad (Nadeau 1997).

This and other floods along the Colorado River increased the support for damming the river and creating a safer canal. Beginning in 1918, studies were funded for what became known as the All-American Canal. Construction began in 1934 and was completed in 1940. The canal began approximately 14 miles northeast of Yuma and went through the ISD at Buttercup Pass (Nadeau 1997). The All-American Canal has been determined to be eligible for inclusion to the NRHP.

By the 1920s, the entertainment industry discovered the unique scenery of the sand dunes, which became the backdrop for major Hollywood movies such as *Beau Geste* (1926 and 1939) and the Bob Hope and Bing Crosby classic movie, *Road to Zanzibar* (1941). The sand dunes are a beautiful photographic subject and they continue to be occasionally used for film, television commercials, and both commercial and artistic still photography.

During World War II, Generals George S. Patton, Jr., and Walton Walker were instrumental in developing a facility to train U.S. troops for the North African Theater of Operations. The Desert Training Center/California-Arizona Maneuver Area (1942–1944) spanned from Searchlight, Nevada, south through eastern California and western Arizona to the U.S.–Mexico border. Camp Pilot Knob was located north of Pilot Knob and about 3 miles northeast of the ISD. The camp lies on both sides of I-8, but most of it

is north of I-8 (Pignuolo et al. 1997). From Camp Pilot Knob, armor and infantry conducted exercises in the ISD (Pignuolo et al. 1997; Underwood and Cleland 2002).

The primary use of the ISD today is for recreation. This usage also has historical roots, beginning with families from the Yuma area and Imperial Valley who traveled to the sand dunes to drive Plank Road and have a Sunday picnic. By the 1930s, hot rods were being developed and raced informally in the dry lakes of the Mojave Desert. At the same time, the first dune buggies were being tried out at the ISD. Ubiquitous and cheap, Model T and Model A Fords typically served as the basic chassis for both types of highly modified vehicles. After World War II, the ISD became increasingly popular as a place for families to camp and develop machines for driving in the sand. By the mid-1960s, Volkswagen Beetle-based dune buggies were being produced commercially. Numerous small shops and manufacturing facilities now produce sand rails and dune buggies with a wide variety of engine and chassis configurations.

Today, the Planning Area is a major recreational destination during the winter months. On any winter weekend, nearly 100,000 people visit the dunes to camp and drive or ride an ever-widening array of dune vehicles.

3.19.2 Demographic and Socioeconomic Characteristics

As described above, the Planning Area MDA includes the 10 counties of La Paz, Maricopa, Pima, and Yuma in Arizona, and Imperial, Los Angeles, Orange, Riverside, San Bernardino, and San Diego in California. This section describes the demographic and socioeconomic characteristics of the residents of the 10-county Planning Area MDA. The 10 counties of the Planning Area MDA make up a large land area encompassing 44.3 million acres.

Much of the demographic data presented in this report were derived from the 2006 American Community Survey, produced by the U.S. Census Bureau (2006). All 10 counties listed above were used for determining the demographic profiles. Current 2006 demographic estimates and projections for 2030 were also reported for selected characteristics (i.e., population, housing units, and employment) based on data collected from the Southern California Association of Governments, the California Employment Development Department, the Arizona Department of Economic Security, and the U.S. Census Bureau. The decision to use 2006 demographic and socioeconomic data was also based on the desire for consistency with the industry sales and employment data used for the regional input-output models. Table 3-25 lists selected demographic data for the 10-county Planning Area MDA, the Planning Area EIA consisting of Imperial, La Paz, and Yuma counties, and to provide perspective, the data are also listed for California, Arizona, and the United States.

**TABLE 3-25
DEMOGRAPHIC PROFILE OF THE PLANNING AREA MARKET AREA V. CALIFORNIA, ARIZONA, AND THE UNITED STATES**

Characteristic	Planning Area EIA ¹	Planning Area MDA ²	California	Arizona	U.S.
Total Population					
2000 U.S. Census	322,102	22,672,278	33,871,648	5,130,632	281,421,906
2006 ³	367,902	25,000,105	36,457,549	6,166,318	299,398,485
2030 Pop (SCAG, SANDAG, Census)	738,240	35,841,308	49,240,891	10,347,543	363,584,000
Population percent change (2000-2006)	14.2%	10.3%	7.6%	20.2%	6.4%
Population percent change (2006-2030)	100.7%	43.4%	35.1%	67.8%	21.4%
Gender³					
Male	50.4%	49.9%	50.0%	50.0%	49.2%
Female	49.6%	50.1%	50.0%	50.0%	50.8%
Age Distribution³					
	100.0%	100.0%	100.0%	100.0%	100.0%
Under 18 years	28.6%	26.9%	26.1%	29.1%	24.6%
18 to 24	11.1%	10.3%	10.4%	6.8%	9.9%
25 to 34	12.7%	14.7%	14.4%	14.6%	13.3%
35 to 45	12.8%	15.1%	15.2%	13.9%	14.7%
45 to 54	11.3%	13.3%	13.8%	12.8%	14.5%
55 to 64	8.4%	9.0%	9.4%	10.0%	10.6%
65 years or older	15.1%	10.7%	10.8%	12.8%	12.4%
Median Age in Years ³	33.4	33.7	34.4	34.6	36.4
Median Household Income ³	\$36,711	\$54,477	\$56,645	\$47,265	\$48,451
Poverty Level³					
Percent of Families Below Poverty	14.5%	10.4%	9.7%	10.1%	9.8%
Percent of Population Below Poverty	15.7%	10.1%	13.1%	14.2%	13.3%
Pop 25+ yrs. College Grad. ³	17.0%	35.0%	29.0%	25.5%	27.0%

**TABLE 3-25
DEMOGRAPHIC PROFILE OF THE PLANNING AREA MARKET AREA V. CALIFORNIA, ARIZONA, AND THE UNITED STATES**

Characteristic	Planning Area EIA ¹	Planning Area MDA ²	California	Arizona	U.S.
Race ³	100.0%	100.0%	100.0%	100.0%	100.0%
American Indian and Alaska Native	2.0%	0.9%	0.7%	4.5%	0.8%
Asian & Pacific Islander	1.4%	10.0%	12.7%	2.5%	4.5%
Black or African American	2.6%	6.3%	6.2%	3.4%	12.4%
White	72.7%	60.5%	59.8%	76.9%	73.9%
Other or Multiple Race	21.2%	22.3%	20.6%	12.7%	8.4%
Hispanic ³	62.7%	40.1%	35.9%	29.2%	14.8%
Language Spoken at Home ³	100.0%	100.0%	100.0%	100.0%	100.0%
English Only	44.8%	55.7%	57.5%	72.0%	80.3%
Spanish	53.1%	32.3%	28.4%	21.9%	12.2%
Other Language	2.1%	12.0%	14.1%	6.1%	7.5%
Total Housing Units ³	152,477	8,973,021	13,174,781	2,605,095	126,311,823
Occupied Housing Units ³	124,058	8,236,280	12,151,227	2,224,992	111,617,402
% Owner Occupied	67.7%	58.6%	58.4%	68.5%	67.3%
% Renter Occupied	32.3%	41.3%	41.6%	31.5%	32.7%
Persons Per Dwelling Unit ³	3.0	3.0	2.9	2.7	2.6
Employment (2006 EDD, BLS)	127,296	11,730,510	17,029,900	2,848,000	144,427,000
% Unemployed	14.4%	4.4%	4.9%	4.9%	4.6%
Occupation ³					
Management, professional and related occupations	24.9%	33.4%	34.7%	32.6%	34.0%
Service occupations	21.7%	16.9%	16.7%	17.3%	16.5%
Sales and office occupations	24.7%	26.9%	26.0%	27.4%	25.9%
Farming, fishing and forestry occupations	6.6%	0.4%	1.3%	0.5%	0.7%
Construction, extraction, maintenance and repair occupations	11.5%	10.2%	9.6%	12.3%	10.0%
Production, transportation, and material moving occupations	10.7%	12.3%	11.7%	9.9%	13.0%

¹EIA counties: Imperial, Yuma, and La Paz.

²MDA counties: EIA counties plus: Los Angeles, San Bernardino, Riverside, Orange, San Diego, Maricopa, and Pima.

³2006 American Community Survey

3.19.2.1 Population

There were 25 million residents of the MDA in 2006, representing about eight percent of the 299.4 million residents in the United States (Figure 3-2). Overall, the 2006 population of Los Angeles County with about 9.5 million residents represented about two-fifths of the population of the MDA. However, the counties of Riverside and San Bernardino, with about two million residents each, have experienced rapid population growth since the 2000 U.S. Census. The population of Riverside jumped 31 percent, and San Bernardino grew 17 percent, compared to about 10 percent growth in population for the MDA over the 2000–2006 period.

3.19.2.2 Population Forecast

The population of the Planning Area MDA is expected to grow by 10.8 million to reach 35.8 million by 2030, a 43 percent increase. By 2030, the population of California would be expected to grow to 49 million (+35 percent) and the population of Arizona would grow to more than 10 million (+68 percent), while the U.S. population would grow at a slower rate to almost 364 million (+21 percent). Within the MDA, the expected growth rates for Imperial (+146 percent), Riverside (+75 percent), and San Bernardino (+71 percent) counties are higher than the expected rate of growth for California or Arizona. In contrast, it is expected that Orange, Los Angeles, and San Diego counties will experience less population growth, adding 25 percent to 31 percent by the year 2030.

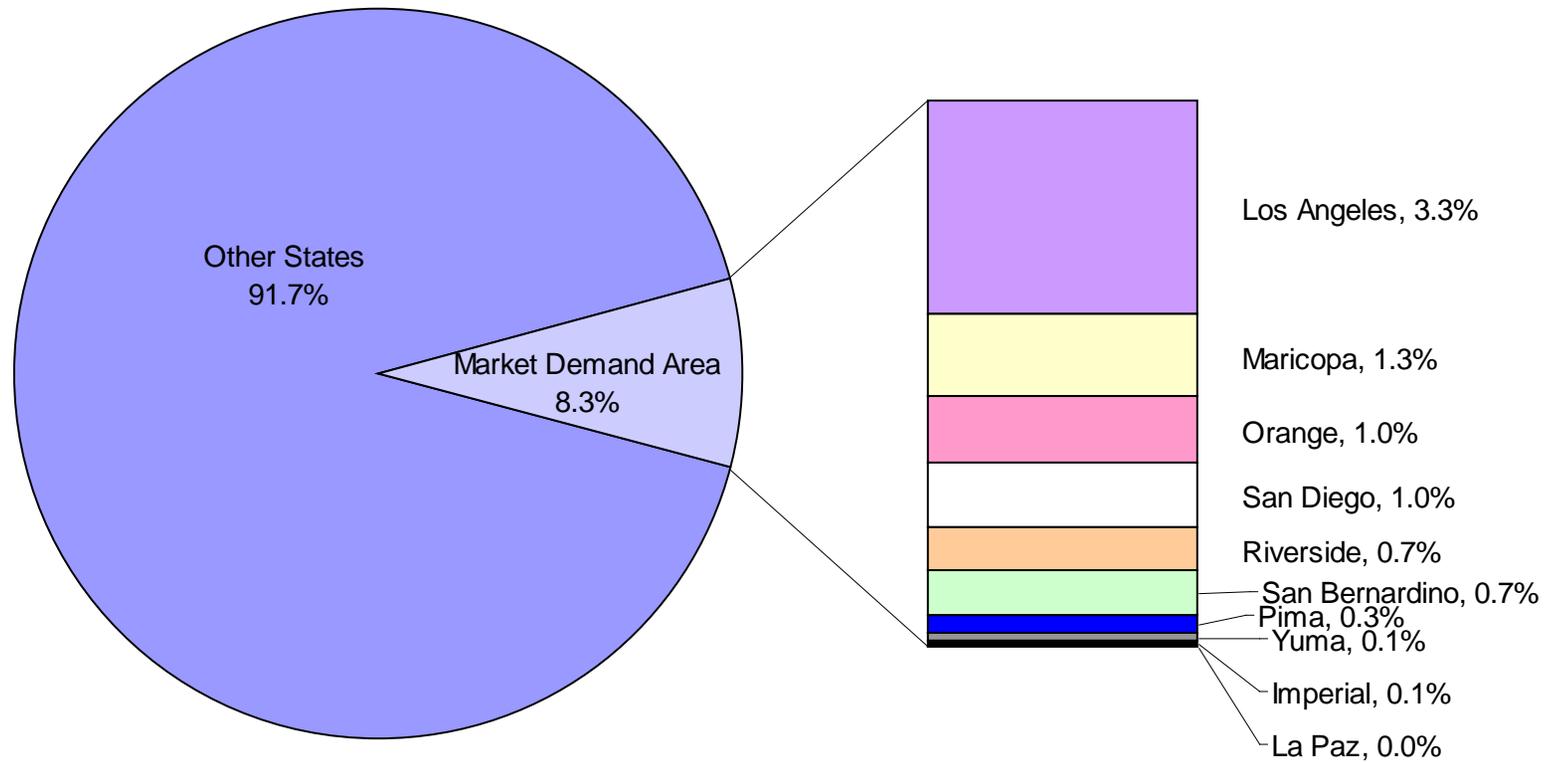
3.19.2.3 Gender and Age

The male-to-female gender ratio for the Planning Area MDA is close to fifty-fifty. This near fifty-fifty ratio is very similar for California, Arizona, the US, and across the individual counties. The median age of residents of the MDA in 2006 was 33.7 years, younger than the median age of the U.S. population at 36.4 years. Within the MDA, the residents of Imperial and San Bernardino counties are significantly younger, with a median age of 30.5 years and 30.3 years, respectively. Only La Paz County recorded a median age well above the national median (49.9 years to 36.4 years, respectively).

3.19.2.4 Household Income and Poverty

The median household income for the Planning Area MDA was \$54,477 in 2006, about \$6,000 higher than the national median income of \$48,451. However, the median income for Orange County (\$70,232) was substantially higher than the balance of the MDA, while the lowest median income was reported for La Paz County (\$28,973). The proportion of population below the poverty level in the MDA was 10.1 percent, which was lower than the poverty level for the nation (13.3 percent). Within the MDA, the poverty level was substantially lower in Orange County (9.7 percent) compared to Imperial County (18.1 percent).

**FIGURE 3-2
PLANNING AREA 10-COUNTY MARKET DEMAND AREA POPULATION**



3.19.2.5 Education Level

The proportion of the population 25 years or older with a college degree was higher in the Planning Area MDA (35.0 percent) than the national average (27.0 percent). Within the MDA, the residents of the counties of Orange (42.9 percent) and San Diego (41.6 percent) recorded the highest proportion of population with college degrees. The lowest percentage of population with college degrees was reported for residents of La Paz County (10.9 percent).

3.19.2.6 Race and Ethnicity

The most noticeable demographic difference between the Planning Area MDA and the nation was with respect to race and ethnicity. When compared to the nation as a whole, the MDA recorded a significantly higher proportion of Asian/Pacific Islanders (10 percent) than the nation (4.5 percent), as well as other or multiple races (20.6 percent) compared to (8.4 percent) for the nation. The proportion of Hispanic residents in the MDA was 40.1 percent, which was significantly higher than reported for the nation (14.8 percent). Imperial County reported the highest percentage of Hispanic residents (75.7 percent) and La Paz County recorded the lowest percentage of Hispanic residents (22.6 percent) within the 10-county MDA.

3.19.2.7 Housing, Ownership, and Household Size

There were 9.0 million housing units in the Planning Area MDA, which represents about 14 percent of the 126.3 million housing units in the United States in 2006. About 8.2 million of the housing units in the MDA are occupied, of which 59 percent are owner-occupied and 41 percent are rented. The percentage of housing that is owner-occupied is substantially higher nationwide (67 percent). Within the MDA, the highest proportion of homeownership was reported for La Paz County (80 percent), and the lowest homeownership rate was reported for Los Angeles County (49 percent). The average household size for the MDA was 3 people and was larger than the nationwide average of 2.6 people.

3.19.2.8 Employment and Unemployment

The total non-farm employment in the Planning Area MDA during 2006 was 11.7 million or about eight percent of the 144.4 million total employees in the United States. The unemployment rate in the MDA averaged 4.4 percent and was very close to the nationwide rate of 4.6 percent. Within the MDA, the highest unemployment rate was reported in Imperial County (15.4 percent) and the lowest in Orange County (3.4 percent).

3.19.2.9 Workforce Occupations

The occupational distribution for the Planning Area MDA was very similar to the states of Arizona and California and the United States as a whole. The largest occupational category was management and professional occupations, representing about one-third of the labor force. The second largest occupational category was sales and office occupations with about one-quarter of the work force in this category. The next largest category was service occupations, which employed about 17 percent of the work force. Production, transportation, and material-moving occupations represented about 12 percent of the workforce. Construction, extraction, maintenance, and repair occupations represented about 10 percent of the workforce. Farming, fishing, and forestry occupations represented a very small proportion of the workforce (less than 1 percent).

3.19.2.10 Employment Forecast

Table 3-26 presents the forecasted employment growth of the Planning Area EIA. Employment is predicted to grow at a similar rate as the nation. By 2016 the Planning Area EIA is expected to employ 167,000 people, a 14.8 percent increase from 2006. Similarly, the nation is expected to experience 13.9 percent growth in employment during that same period.

**TABLE 3-26
EMPLOYMENT GROWTH FORECAST FOR 2016**

Employment	Planning Area EIA	California	Arizona	U.S.
2006	145,523	17,173,500	2,885,070	144,427,000
2016	167,115	19,683,800	3,323,530	164,539,900
Increase	21,592	2,510,300	1,983,800	20,112,900
Percent Increase	14.8%	14.6%	15.2%	13.9%
Annualized Rate	1.38%	1.36%	1.41%	1.30%

Sources: California Employment Development Department.
U.S. Department of Labor, Bureau of Labor Statistics.

3.19.2.11 Demographic Summary

The Planning Area MDA makes up about 8 percent of the population, employment, and the economy of the United States and is greater than 48 of the 50 states. In general, the residents of the MDA are a little younger and are represented by a higher proportion of Hispanics than the states of Arizona and California or the nation. The median household income for the MDA is greater than the nationwide median household income.

3.19.2.12 Community Strength Indicators

In general, the Planning Area EIA has not performed as well as the nation as measured by several community strength indicators. These indicators show that population and employment growth within the EIA was nearly double that of the nation during the last 36 years; however, personal income grew at a rate only slightly higher than the national average, which would indicate that individual income growth is being outpaced at the national level. Compared with the nation, residents of the EIA have lower incomes, higher unemployment, and a lower proportion of the population have college degrees. Income is slightly more evenly distributed among the EIA residents than in the nation, but the economy is less diversified, which can increase the risk associated with economic downturns. The industry sectors that employment is concentrated in, agriculture and government, are usually more recession proof. One area of relative strength is the Housing Affordability Index, which reflects the lower cost of housing in the EIA compared with the nation (Table 3-27).

**TABLE 3-27
INDICATORS OF COMMUNITY ECONOMIC STRENGTH**

Community Strength Indicators and Comparison Categories	Planning Area EIA	U.S.
Population Growth (Annualized rate, 1970-2006)	2.6%	0.6%
Employment Growth (Annualized rate, 1970-2006)	2.5%	1.4%
Personal Income Growth (Adjusted for Inflation, Annualized rate, 1970-2006)	3.1%	2.2%
Non-labor Income Share of Total in 2006	33.3%	37.1%
Median Age	32.4 yrs.	37.3 yrs.
Per Capita Income (2006)	\$22,313	\$26,371
Average Earnings per Job (2006)	\$37,212	\$30,269
Education Rate (% of population 25 and over who have a college degree)	11.1%	14.5%
Education Rate (% of population 25 and over who have less than a high school diploma)	37.3%	21.0%
Employment Specialization	221	155
Rich-Poor Ratio (for each household that made over \$100K, how many households made less than \$30K)	7.2	8.7
Housing Affordability (100 or above means that the median family can afford the median house)	133	186
Change in Housing Affordability (% change in index 1990-2000; Positive means the area is more affordable).	20.2%	10.3%
Government Share of Total Employment	23%	15%
Unemployment Rate (2007)	15.8%	4.6%

Source: Headwaters Economics, Economic Profile System, developed for BLM.

3.19.3 Social Trends

The Planning Area is sometimes the center of passionate discussions about recreational land access, land use, environmental preservation, and resource management. Social values for lands and natural resources vary greatly by individual and groups. Concerned citizens reported to the BLM that they value the ISD for the following (BLM 2003b):

- spirituality and solitude
- environmental preservation
- wilderness opportunities
- OHV recreation opportunities
- camping
- outdoor experiences and exploration

A majority of Americans are concerned about the environment, but do not think that the answer to environmental protection is forbidding the use of public lands. Seventy-eight percent of Americans say outdoor recreation, overall, has a “good effect” or “no effect” on the environment. Sixty-two percent sampled believe the environmental effects of outdoor recreation are “good.” Eleven percent said outdoor recreation has a “bad effect” (American Recreation Coalition 1999).

Most Americans also believe that the key to environmentally safe recreation is responsible behavior. Forty-seven percent of Americans “strongly agree” with the following statement: “If people would just follow the rules in parks and other outdoor recreation areas, their use of the land would have no significant effects on the environment,” and 42 percent “mostly agree” with this statement. Similarly, 90 percent “strongly” or “mostly agree” that “most recreation is compatible with environmental protection when done responsibly.” However, 76 percent say they are “very concerned that people who engage in outdoor recreation hurt the environment by leaving trash and damaging the landscape” (American Recreation Coalition 1999).

Survey data indicates that most Americans believe that outdoor recreation can promote environmental responsibility. Eighty-nine percent “strongly” or “mostly agree” with the statement: “Outdoor recreation benefits the environment because it gives people more of a reason to care about environmental protection.” Eighty-six percent agree with the statement “spending time outdoors gives people the incentive to take care of the environment properly” (American Recreation Coalition 1999).

3.19.4 Affected Users

The stakeholder types presented in this section were created to facilitate the discussion of social values and impacts. While it is believed that this typology is a reasonably accurate generalization of the types of people with interests in the Planning Area, particular views of individuals do vary. The user-community typology was derived from the ongoing BLM outreach and consultation process associated with the Planning Area. Some members of the public may identify with more than one of these groups. Use of the term group is not meant to imply that these individuals are members of a particular organization. They do share values, beliefs, attitudes, and activities. In that sense, the term community is used to refer to them. These user-communities are briefly described below in order of their relative size.

3.19.4.1 The OHV Community

In California, there are 3.5 million OHV enthusiasts—14.2 percent of all households (California State Parks 2002). The Arizona Game and Fish Department's OHV Program states that OHV recreation use on public lands has increased significantly:

Since 1977 the increased use of OHVs has out-paced Arizona's population growth. OHV use has more than doubled, while the population has increased by slightly more than 65 percent. A study completed in 1990 estimated the number of OHVs (4X4s, buggies/sand rails, [all-terrain vehicles (ATVs)], motorcycles, and snowmobiles) in Arizona to be over 550,000. (Arizona Game and Fish Department 2009)

The *Imperial Sand Dunes Visitor Research Case Study* (BLM 1993) characterizes visitors to the Planning Area as predominately white (68 percent), relatively young (85 percent are 45 years of age or younger), majority male (66 percent), and most having at least a high school education (91 percent). Most visitors are from California (82 percent), although many visitors are from Arizona (15 percent). The activity most visitors participate in is OHV riding (90 percent). However, only one third listed OHV riding as the primary reason for visiting the Planning Area. Other reasons included: the dunes, friends, open spaces, play, accessible, curiosity, to get away, vacation, and to race. The majority of visitors (94 percent) learned about the ISD from friends and family.

Participation in outdoor activities can greatly increase family interaction and foster cohesion. Numerous recreational users identified building family values and family interaction as important reasons why they enjoy the Planning Area. Several individuals stated at BLM public comment meetings that participation in recreational opportunities within the Planning Area gave their teenage children positive social interactions. Some members of the public attributed their children's lack of interest in drugs to their increased interest in recreational use of the ISD. Numerous comments from the public

indicated that the Planning Area has been used by extended families for several generations (BLM 2003b).

Most Americans believe that young people should participate in recreation. A survey by *Outdoor Recreation In America 1999: The Family and the Environment* (American Recreation Coalition 1999) showed that 72 percent of the participants believed that outdoor recreation promotes good health, 70 percent that outdoor recreation creates shared experiences family and friends can bond over, 69 percent that outdoor recreation teaches appreciation of nature, 68 percent that it helps children develop important physical skills, 65 percent that outdoor recreation builds self-esteem and personal growth, and 62 percent that it helps children develop important interpersonal skills.

Many recreational users have concerns about the future of OHV recreational use of the public land in the California desert. The number of acres of public lands in the California desert that are open to OHV use has decreased since the Wilderness Act of 1964 designated approximately 1 million acres of California as wilderness. In addition, between 1968 and 1978, there were 14 additional areas that were designated as wilderness. Furthermore, wilderness acts or monument designations in 1984, 1992, 1994, and 1999 closed or restricted motor vehicle access by more than 8,581,259 acres. As summarized by California State Parks:

The California Desert Protection Act of 1994 affected OHV recreation through its wilderness designations and through the transfer of BLM land to the National Park Service. The California Desert District Office of the BLM managed 13.5 million acres, the majority of which was available for OHV recreation prior to passage of the California Desert Protection Act. Of the original 13.5 million acres, 6.4 million acres (48 percent) were closed [to OHV use] as a result of wilderness area designations and land transfers to the National Park Service. (California State Parks 2002)

The number of participants in OHV activities, as a whole, and within the Planning Area and elsewhere has increased in the past few decades, while the amount of public land on which to participate has decreased. "Since 1980, the acreage available to Green Sticker vehicles for recreation has shrunk 48 percent in our deserts alone, while off-highway vehicle registrations have increased 108 percent" (California State Parks 2002). There has been a 30 percent increase in the number of dirt bike registrations between 1983 and 2000, a 96 percent increase in the number of all-terrain vehicle registrations between 1983 and 2000, a 96 percent increase in the number of dune buggy and sand rail registrations between 1983 and 2000, and a 74 percent increase in the number of street licensed four-wheel drive vehicle registrations between 1994 and 2000.

This situation has increased recreationists' concerns about OHV access to public lands. These concerns are expressed in essentially two forms:

- OHV access may be reduced to the point that crowding will diminish quality of their recreational experience,
- OHV access may not continue to be available for future generations

Based on comments received by the BLM (2003b), the list below briefly summarizes the views of the OHV community. In general, OHV enthusiasts have become more informed about environmental concerns and environmental politics within the Planning Area during the past decade, and OHV groups are occasionally funding their own environmental surveys. In general, the OHV community believes that:

- They do not harm the environment by their recreational activities within the Planning Area.
- They have considerable respect for the land and the species that live there.
- Recent biological surveys suggest that recreational use is compatible with species conservation.
- Species conservation concerns are used politically by environmental groups to close the ISD to OHV use (BLM 2003b).

Through the public comment process, a type of irresponsible, non-traditional OHV recreationist was also identified. This type operates OHVs in an unsafe manner and behaves in disruptive and troublesome ways. Mainstream OHV recreational users express concerns about this small number of people who cause problems within the Planning Area. They feel that the irresponsible OHV recreationists give OHV enthusiasts a bad reputation and make the OHV community more vulnerable to attack by opponents (BLM 2003b).

3.19.4.2 The Environmental Community

Based on the comments received during the public comment period for the 2003 ISD RAMP/EIS, the environmental advocacy groups recreationally use the ISD as a hiking area. They desire a quiet, peaceful time of reflection and observation of nature during their visit. Members of this group have indicated that the noise from OHV recreation and from freight trains that run along the northeast side of the dunes detract substantially from their recreational experience. They believe that wild, natural places in which to enjoy solitude and peace are increasingly difficult to find. They feel a need to establish more wilderness to preserve threatened and endangered species and their natural habitats, and to provide a place to get away from mechanized, modern life.

According to the American Recreation Coalition (1999), 51 percent of the environmental leaders and activists say to experience nature is a very important reason to participate in

outdoor recreation. This percentage was the same for environmental donors (those who are willing to pay to improve the environment, but with little time to get involved themselves).

Generally, environmental advocacy groups support a more restrictive plan for OHV recreation in the Planning Area. The public input process revealed that people were concerned that the management of the Planning Area would not provide enough acreage for viable habitat for threatened and/or endangered species, and other dune endemic species (BLM 2003b). They also expressed concerns about OHV activities within the Planning Area in terms of air pollution, litter, habitat destruction, and disturbance to native plant species and wildlife. Many thought that dividing the acreage evenly for recreational use and protection would be desirable. Many environmentalists indicated that they were not confident that OHV recreational use could occur without harming the environment. They believe that OHV recreation makes the Planning Area undesirable and unavailable for the recreational use of the area by non-mechanized users of all kinds (BLM 2003b).

The conditions and resources on public lands are important to the environmental advocacy groups. Many members of these groups appreciate just knowing that these areas exist, even if they never visit the areas. Members of these groups feel strongly that the public lands must be managed to protect the resources for future generations. Overall, the environmental advocacy groups that participated in the public comment process for the 2003 ISD RAMP/EIS were concerned that OHV recreation was not compatible with their desired recreational experiences or with resource preservation, conservation, and protection (BLM 2003b).

3.19.4.3 On-Site Vendors

Vendors are merchants who temporarily engage in commercial activities within the Planning Area during the active vending season. This vending season is defined by the BLM as October 1 through May 31. There are no permanent facilities for vendors other than a gravel pad for vendors near the Cahuilla Ranger Station. Vendors typically sell from, and live in, tents or RVs. Some set up substantial encampments and tent stores or cafes, while others set up a small ramada or sell from a vehicle. Vendors are allowed to set up after noon on Thursdays and they must vacate the area by noon on Monday. In comments to the BLM, vendors expressed a number of common beliefs and views:

- Vendors believe that they perform a public service in providing supplies and services to the recreational users within the Planning Area.
- Vendors have stated that their businesses are highly profitable, even when operated during the slower periods of the recreational season.
- Vendors believe that they have a right to continue to operate in the Planning Area.

- Many vendors expressed resentment regarding the regulations under which they are allowed to operate, such as the rule requiring that they pack up and leave every week. In the view of the vendors, this rule causes a great deal of effort and results in worse service and fewer products for the OHV community. The vendors believe that their services should be available daily, not just on weekends and that they should be able to set up and live there for the season rather than having to break down and leave every week.
- Many of the vendors believe that they have, or should have, the right to live where they vend to protect their business from thieves and vandals.
- Few vendors acknowledge the negative impacts they have on businesses in nearby communities.

The vendors strongly support unrestricted vending and season-long residential use of the vending area for the vendors in order to provide better services and a wider range of products (BLM 2003b).

3.19.4.4 Business Owners in Nearby Communities

In comments to the BLM, OHV-related business owners suggested their operations were highly profitable. Most felt that any restriction on OHV recreation could have negative impacts on their businesses. In their views, some proposals would drive some businesses into bankruptcy. For example, nightly curfews have been proposed to cut down on crime and disruptive behavior; such a curfew could make it difficult for firms that sell driving lights for OHVs. A curfew would also eliminate a time for OHV recreation enjoyed by many, which might also cause more crowding during the day in popular areas. A weekend nighttime curfew for Competition Hill has been put into effect because of public safety concerns.

Business owners felt that restricting visitation to the Planning Area would most likely have the largest negative financial impact to the OHV-related businesses. The OHV-related business owners support increased OHV recreation and indicate that they believe jobs would be lost if OHV recreation were to be severely restricted (BLM 2003b).

On the other hand, because on-site vendors compete with local business owners, some local business owners believe that they may fail financially if unrestricted vending is allowed in the Planning Area. Many business owners believe that they are unable to compete with on-site vendors since the latter are nomadic and do not have the expenses associated with fixed-base operations, such as a mortgage, property maintenance, insurance, and property taxes.

3.19.4.5 Community Representatives

Numerous officials from surrounding local communities state that they support OHV recreation in the Planning Area. They stated that the recreational use within the Planning Area provides jobs for their communities at grocery stores, restaurants, gas stations, medical facilities, as well as vehicle sales, repair, and supply shops. Some officials indicated that the money that is spent in their communities then is redistributed in the community when the local residents spend associated income. The effect of the money spent by the recreational users is thought to be significant due to the cumulative effect of the jobs that are supported by these expenditures (BLM 2003b).

The increased law enforcement within the Planning Area includes the use of law enforcement officers from nearby communities. Currently, the use of local law enforcement officers is funded by a grant. The local community support of providing law enforcement officers for the Planning Area may change if continued external funding is not available to support their efforts (BLM 2003b).

3.19.4.6 The Quechan Tribe

The ISD are primarily associated with the Quechan, who lived along the Colorado River in the Yuma vicinity (Russell et al. 2002). The sand dunes appear in traditional Quechan origin stories and other story cycles and also in the oral traditions of other nearby tribes (Russell et al. 2002). The Quechan view the sand dunes as an important part of their cultural traditions, but visit them infrequently. When they do visit, it is to meditate, walk, and experience the dune environment. Tribal representatives report being reasonably pleased with the balance between preservation and OHV recreation, but are concerned about the plants and animals as well as the pollution from the powerful machines. They also expressed concern for the safety of the OHV recreationists (Russell et al. 2002).

3.19.5 Economic Characteristics

The economy of the Planning Area EIA represents about a half of one percent of the California economy and less than one-tenth of one percent of the U.S. economy. As is indicated in Table 3-28, the gross domestic product for the EIA region in 2006 is estimated to be \$7.9 billion.

**TABLE 3-28
2006 GROSS DOMESTIC PRODUCT**

	Planning Area EIA	California	U.S.
Gross Domestic Product (\$ billions)	\$7.9 B	\$1,742.2 B	\$13,178.4 B
Planning Area EIA as a % of Each Region	100.0%	0.5%	0.1%

Source: U.S. Dept. of Commerce, Bureau of Economic Analysis

The distribution of employment by industry sector for the Planning Area EIA is somewhat similar to the state of California and the nation as a whole, with some noticeable exceptions. Although private sector employment is predominantly service-oriented, a higher proportion of employees are in the goods producing sector (21 percent) as compared to California or the nation (18 percent) Specifically, a higher percentage of the EIA's employment is found in the natural resource and agricultural categories than California or nationally (Table 3-29). In contrast, there is a significantly smaller proportion of employment in the financial area (4 percent versus 7 percent) and the professional and business service sector (10 percent versus 18 percent) when comparing the EIA with the nation as a whole.

**TABLE 3-29
DISTRIBUTION OF PRIVATE SECTOR EMPLOYEES**

	Planning Area	California	U.S.
Goods-producing	21.2%	17.8%	18.1%
Natural Resources and Mining	1.7%	0.4%	0.6%
Agriculture, forestry, fishing & hunting	1.5%	0.2%	0.1%
Mining	0.2%	0.2%	0.5%
Construction	9.7%	6.9%	6.1%
Manufacturing (Including forest products)	9.8%	10.5%	11.4%
Service-providing	78.8%	82.2%	81.9%
Trade, Transportation, and Utilities	31.4%	22.0%	22.3%
Information	1.3%	3.8%	2.8%
Financial Activities	4.1%	7.7%	7.4%
Professional and Business Services	9.9%	19.3%	17.5%
Education and Health Services	14.1%	13.5%	16.2%
Leisure and Hospitality	14.3%	11.7%	11.1%
Other Services	3.6%	4.2%	4.6%
Unclassified	0.1%	*	*
Total	100.0%	100.0%	100.0%

*Less than 0.1%

Source: California Employment Development Department

To produce the estimates of employment and the value of regional product, a regional input–output model was developed for the Planning Area EIA. This area includes Yuma and La Paz counties in Arizona, as well as Imperial County and the Mecca and Blythe areas of Riverside County in California. The regional input-output model was based on software and data provided by Impact Analysis for Planning (IMPLAN)/Pro.¹ The value of the IMPLAN/Pro system was to provide a basis for measuring the size of key economic sectors of the EIA in terms of output, income, and employment. In addition to providing measurements of existing economic conditions for the EIA and the subset of BLM managed lands, the input-output system also provided the ability to model the expected impact of changes originating from outside the Planning Area’s EIA based on planning alternatives for the proposed BLM resource management plan.

The cumulative total economic impacts (direct, indirect, and induced) were determined for each of the BLM-proposed planning alternatives for the Planning Area’s EIA and are presented in Chapter 4. The economic impact definitions listed below explain the terms that will be used in the following paragraphs and tables:

Output. Output is a measure of the sales generated within the local economy (i.e., the Planning Area’s EIA). The total output (cumulative impact) has three subcomponents: the direct sales impact, the indirect sales impact, and the induced sales impact.

- **Direct sales** impacts occur when a recreational visitor to the Planning Area purchases a meal in a local area restaurant.
- **Indirect sales** impacts occur when businesses make purchases from other businesses, (e.g., supplies or services). In turn each of the indirect businesses must also make purchases from their suppliers.
- **Induced sales** are generated by the purchases of employees and owners of the businesses with direct, indirect, and induced sales. The employees and owners spend their incomes from the compensation for labor and ownership that was required to produce the direct output, as well as all indirect and induced output required by the direct sales.
- **Cumulative sales** impacts or the total output impact is the sum of the direct impact, the indirect impact, and the induced impact as listed above. The cumulative impacts are also measured for employment, income, and value added.

¹IMPLAN (Impact Analysis for PLANning) was originally developed by the U.S. Department of Agriculture Forest Service in cooperation with the Federal Emergency Management Agency and the BLM to assist the Forest Service in land and resource management planning.

Employment. Employment is a measure of the amount of full and part-time annual average employment, including self-employed proprietors, within the Planning Area economy.

Value added. Value added is a measure of the amount of value created within the economy. In this study it is the amount of value created within the Planning Area impact area's economy. There are four value-added subcomponents.

- **Employee compensation** includes the wages and salaries of workers who are paid by employers as well as the cost of benefits such as health and life insurance, retirement payments, and non-cash compensation.
- **Proprietary income** consists of payments received by self-employed individuals as income from the private businesses they own. This includes income received by many private business owners ranging from a lawn care service or a dry-cleaning business, as well as doctors, attorneys, consultant, and other professionals that own their business.
- **Other property type income** consists of payments for interest, rents, royalties, and dividends. Payments to individuals in the form of rents received on property, royalties from contracts, and dividends paid by corporations are included here as well as corporate profits earned by corporations.
- **Indirect business taxes** consist of excise taxes, property taxes, fees, licenses, and sales taxes paid by businesses. These taxes occur during the normal operation of businesses, but do not include taxes on profit or income.

3.19.5.1 Economic Characteristics of the Planning Area EIA

The Planning Area EIA generates about \$10.2 billion in gross regional product as measured by value added (Table 3-30). The total output (sales) of the EIA is approximately \$23.1 billion, and the total employee income is \$6.1 billion. The \$23.1 billion in output within the EIA supports over 168,000 jobs. The total value added per job is approximately \$60,300.

The largest non-government sector of the EIA economy in terms of value added is agriculture. This sector added \$1.64 billion to the local economy while employing over 34,000 people. Retail trade was the next most important sector, contributing \$901.3 million and employing 19,700 people, followed by the real estate sector, which added \$841.0 million to the area economy while employing 2,817 people. Another important sector is the health and social services sector, contributing \$534.6 million and employing over 11,000 people. The government sector employs 43,600 people and adds \$3.2 billion to the impact area's economy.

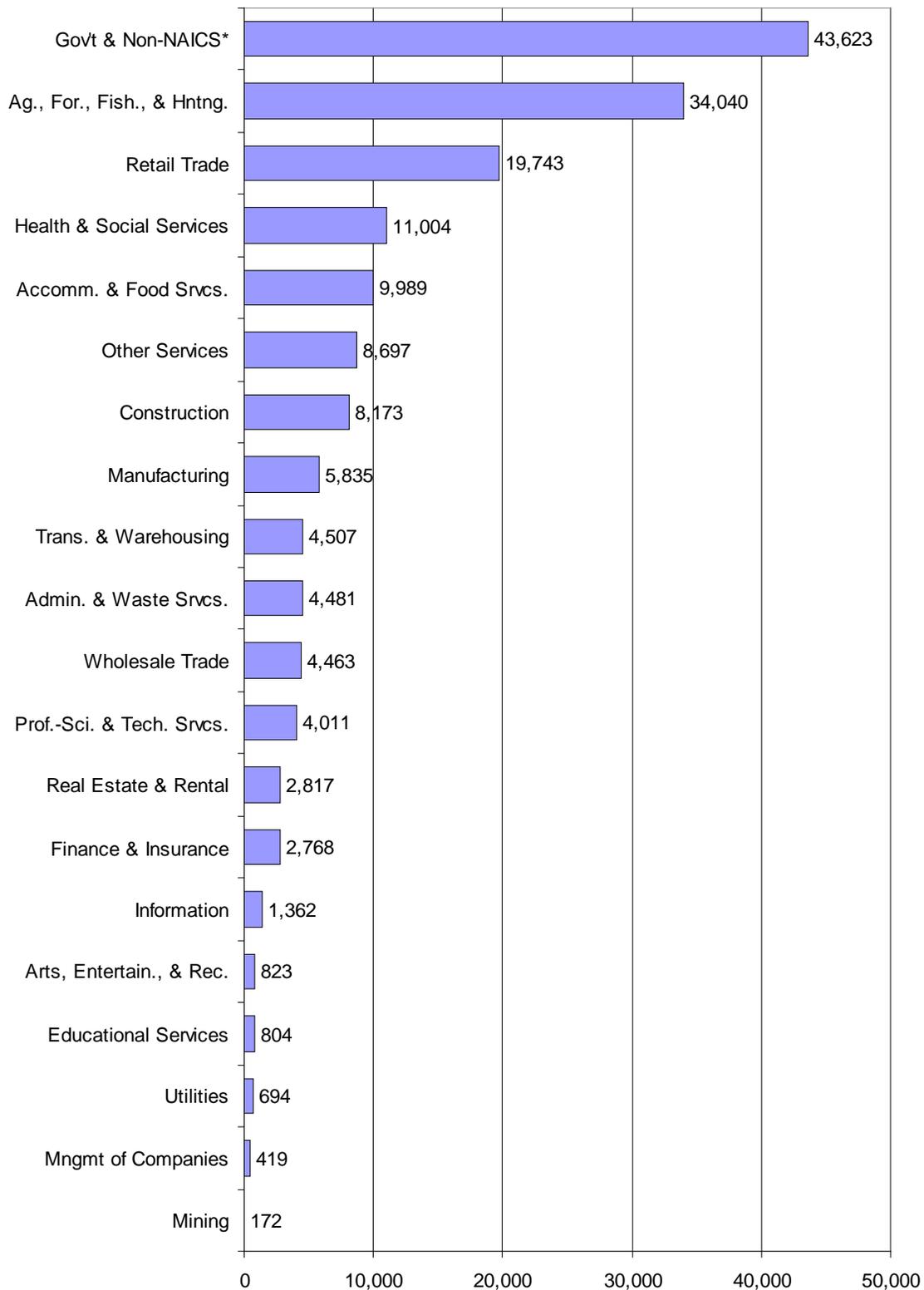
**TABLE 3-30
PLANNING AREA EIA TOTAL ECONOMIC VALUE ADDED
BY MAJOR SECTOR DURING 2007**

Major Category	Value Added (millions \$)	Number of Employees
Agriculture, Forestry, Fish & Hunting	1,635.0	34,040
Retail Trade	901.3	19,743
Real Estate & Rental	841.0	2,817
Health & Social Services	534.6	11,004
Construction	441.7	8,173
Wholesale Trade	399.8	4,463
Manufacturing	390.0	5,835
Accommodation & Food Services	266.1	9,989
Transportation & Warehousing	254.6	4,507
Professional, Scientific, and Tech. Services	226.9	4,011
Other Services	225.1	8,697
Utilities	215.1	694
Finance & Insurance	192.9	2,768
Administrative & Waste Services	178.3	4,481
Information	152.6	1,362
Mining	25.8	172
Management of Companies	28.5	419
Educational Services	26.5	804
Arts–Entertainment & Recreation	20.4	823
Government & Non-North American Industry Classification System	3,200.3	43,623
Total	10,156.5	168,424

Source: IMPLAN/Pro, Planning Area EIA, 2007

When the above-listed sectors are ranked by employment, the largest sector of the EIA economy is government and non-North American Industry Classification System. In other words the public sector accounts for the largest single source of employment in the EIA (Figure 3-3). The agricultural sector is the next largest sector in terms of employment followed by retail trade.

**FIGURE 3-3
EMPLOYMENT BY SECTOR (JOBS IN 000s)**



3.19.5.2 Mineral Resources

3.19.5.2.1 Baseline Economic Conditions

3.19.5.2.1.1 Locatables

As of September 2008, there was one mining claim filed on BLM-administered land within the Planning Area. The cost of a mining claim is \$140 annually. The mining claim entitles the holder to the mineral rights, but not to operate a mine. To operate a mine the owner of the claim must also file a Mining Notice for exploration activities of less than five acres or a Plan of Operations for mining of more than five acres.

No notices have been filed with BLM on the claim. No measurable commercial activity for mining exists. No Plans of Operations have been submitted to the BLM to mine within the Planning Area. The existing conditions for locatables on BLM lands within the Planning Area do not yield an economic output. Therefore, no economic baseline exists for locatable minerals, and they are not addressed further in this section.

3.19.5.2.1.2 Leasables

Leasables include oil and gas, geothermal, and coal resources. There are no oil, gas, or coal leases on BLM-administered lands within the Planning Area.

There are KGRAs that have been identified with commercial production potential in the Planning Area (see Map 3-8). At this time, there is no commercial production of geothermal energy on BLM-administered lands within the Planning Area.

Proximity to major electrical distribution systems is a specific requirement for financial feasibility and is dependent on the SEMPRA Energy transmission corridor. If and when a project is proposed to the BLM, the BLM and operator(s) would need to prepare a project-specific Plan of Development (POD). Each POD would need to address the potential impacts (including economic and social impacts) of a proposed geothermal mineral lease and development.

3.19.5.2.2 Saleables

There are no commercial saleable resource activities (e.g., sand and gravel extraction) on BLM lands within the Planning Area, although there is a free-use permit granted by BLM to the County of Imperial for extraction in the Glamis area. This activity is outside of the ISD SRMA. There are large sand and gravel extraction operations occurring to the west of the Planning Area boundary along the east side of the canal. There are significant potential resources for sand gravel extraction within the Planning Area. Sand and gravel operators are not required to pay a rent for using public land. The rate for sand and gravel disposal (extraction) from public lands within the El Centro Field Office area is \$1.10 per cubic yard or \$0.73 per ton. As there is no economic activity in sand

and gravel extraction within the Planning Area, no economic baseline exists, and the resource is not addressed further in this section.

3.19.5.2.3 Program-specific Sociocultural Conditions

Gold mining is a major historic theme in California, particularly in the northern part of the state. Gold mining is also a major historic theme in several areas near the Planning Area. The following were gold mining districts near the Planning Area in the late nineteenth century:

- Julian and Cuyamaca areas, approximately 80 miles to the west
- Along the Lower Colorado River, about 30 miles east
- Along the Cargo Muchacho Mountains, about 6 miles to the northeast

In the entertainment media and in popular culture, nineteenth-century mining is associated with rugged individualism, the frontier, and nation building. Modern mining is not well known to or understood by the general public and has no associated romance and mythology. While the remains of nineteenth-century mining are considered valuable heritage resources, modern industrial mining facilities are generally viewed as eyesores.

Environmentalists and Native Americans have concerns about and considerable resistance to expanding mineral extraction operations or new operations in the desert surrounding the Planning Area. The OHV community has no particular views on mineral extraction as long as it does not restrict access to the Planning Area. No mineral resource operation exists within the Planning Area and none are proposed.

3.19.5.3 Recreation Management

3.19.5.3.1 Baseline Economic Conditions

The baseline economic conditions for recreational activities in the Planning Area were derived from a mail survey conducted during the period of March 2006 through early May 2006.² The survey was sponsored by the United Desert Gateway and BLM. The study titled, *A Profile of the 2006 Visitors to the Imperial Sand Dunes Recreational Area*, was authored by Dr. Glen E. Haas and Dr. Kimberly Collins (2008). The existing condition economic baseline information for recreation in the Planning Area as detailed in this chapter, was derived from data provided in Part 2 of the 2006 survey.

The 2006 survey sample was drawn from overnight registration records for Planning Area users that were collected and maintained by the Imperial County Sheriff's Office

² No independent review of the accuracy of the 2006 survey data was conducted.

from November 1, 2005 through March 10, 2006. A systematic sample (every 20th registration form) yielding a total of 800 forms was drawn and roughly 300 completed questionnaires were returned. The data were entered into a spreadsheet and descriptive statistics were derived using the Statistical Package for the Social Sciences statistical software package.

In Part 2 of the study, expenditure information was projected for nine expenditure categories. The following Table 3-31 summarizes the survey data with some modification. First, the actual 2006 overnight camping data provided by BLM was used in the table value rather than an estimate. Second, an outlier analysis was performed on the raw data set. Outliers were removed in the grocery and supplies, gasoline and oil, and vehicle maintenance and repair categories. No outliers were found in the other categories.

**TABLE 3-31
BREAKDOWN OF EXPENDITURES BY VISITORS AND
PERCENTAGE OF VISITOR DOLLARS SPENT IN THE PLANNING AREA REGION**

Expenditure Category	Expenditures (\$) Based on 1.25 Million Visitors or 350,000 Vehicles	Percent Spent in the Planning Area Region	Planning Area Estimated In-Region Expenditures (\$)
Overnight Camping Permits	3,730,820	95.2	3,551,740
Motels, Hotels, RV Parks, Resorts	1,839,786	100.0	1,839,786
Restaurants and Bars	13,372,450	86.6	11,580,541
Groceries and Supplies	52,978,800	56.4	29,880,043
Gasoline and Oil	64,970,500	60.4	39,242,182
Vehicle Maintenance and Repair	4,830,000	78.7	3,801,210
Entertainment and Recreation Entrance Fees	2,140,810	93.1	1,993,094
Souvenirs and Clothing	18,243,866	92.9	16,948,551
Retail Sales	4,355,050	80.2	3,492,750
Totals	166,462,082	67.5	112,329,897

Sources: Kimberly Collins 2006; CIC Research, Inc. 2009

Based on the estimate provided in *A Profile of the 2006 Visitor to the Imperial Sand Dunes Recreational Area*, the current conditions render an estimated 350,000 towing vehicle visits annually (i.e., 1.25 million visitors divided by 3.5 visitors per vehicle).

Using the per visitor group spending values with the outliers removed, the percentage of responses indicating expenditures in each category were multiplied by 350,000 estimated vehicle visits (Part 2, Page 4) to obtain total expenditures for the season. Thus, the Planning Area accounted for \$166,462,082 in total visit-related expenditures. Each figure was multiplied by the mean percent of dollars spent in the region. Thus, \$112,329,897 of total expenditures (67.5 percent) are believed to be spent in the

Planning Area region. This implies that each vehicle visit averaged \$475.61 in total expenditures, of which \$320.94 was spent in the Planning Area region.

Based on the IMPLAN model for the Planning Area EIA, the baseline economic impacts of recreation are reported in Table 3-32. The total cumulative impact (direct, indirect, and induced) generated by recreational use of the Planning Area is about \$171 million per year. In terms of employment, the baseline conditions result in 2,139 jobs with \$67,493,951 in labor income. Tax revenue generated is estimated to be \$18,122,099 million.

**TABLE 3-32
BASELINE ECONOMIC CONDITION FOR RECREATIONAL USE OF
THE PLANNING AREA**

Baseline Economic Condition—350,000 Annual Vehicle Visits to Planning Area			
Category	Direct	Indirect & Induced	Cumulative
Dollar Value	\$112,329,897	\$58,370,012	\$170,699,909
Employment	1,625	515	2,139
Labor Income	\$47,496,321	\$19,997,630	\$67,493,951
Property Income	\$13,011,561	\$10,554,842	\$23,566,404
Tax Revenue	\$14,854,336	\$3,267,763	\$18,122,099
Value Added	\$75,362,270	\$33,820,254	\$109,182,525

Source: CIC Research, Inc. and MIG IMPLAN/Pro (base year 2007)

Table 3-33 provides the economic impact based on the IMPLAN modeling by industry sector for the study region. As the table indicates, the Planning Area activity accounts for a significant percentage of federal government enterprise (8.5 percent), entertainment and amusement (6.4 percent), gas stations (5.3 percent), food and beverage (4.4 percent), and auto repair (4.2 percent). The economic impact on other sectors of the economy attributable to Planning Area activities is fairly modest.

**TABLE 3-33
2007 IMPLAN MODEL ESTIMATE OF THE ECONOMIC IMPACT FROM
RECREATIONAL ACTIVITIES FOR THE THREE-COUNTY EIA***

Industry	Impact (millions \$)	Baseline Economy (millions \$)	Percent of Baseline Economy
Ag Excluding Cattle	0.817	3,128.520	0.0
Cattle Ranching	0.040	162.295	0.0
Mining and Extractive Industries	0.091	28.637	0.3
Sand and Gravel	0.002	21.150	0.0
Utilities	2.432	397.156	0.6
Construction	0.003	957.715	0.0
Maintenance	0.863	143.843	0.6
Manufacturing	4.029	2,155.013	0.2
Wholesale Trade	3.168	2,270.296	0.1
Food and Beverage Stores	30.674	693.572	4.4
Gas Stations	39.587	745.056	5.3
Other Retail	24.652	3,644.454	0.7
Transportation and Warehousing	3.726	502.777	0.7
Information	2.136	325.566	0.7
Finance and Insurance	2.946	376.015	0.8
Real Estate and Rental	11.061	1,321.204	0.8
Professional, Scientific, and Tech. Services	2.580	387.780	0.7
Management of Companies	0.642	65.369	1.0
Administrative & Waste Services	2.948	319.239	0.9
Educational Services	0.255	44.696	0.6
Health and Social Services	5.067	892.217	0.6
Entertainment and Amusement	2.237	34.826	6.4
Accommodations	2.279	84.239	2.7
Eating and Drinking Establishments	14.176	466.520	3.0
Auto Repair	4.359	103.905	4.2
Other Services	1.262	188.747	0.7
Other Government and NEI	4.969	3,591.694	0.1
Federal Government Enterprise (excluded: USPS & Elec. Gen.)	3.699	43.610	8.5
Totals	170.700	23,096.110	0.7

Source: IMPLAN, Minnesota IMPLAN Group, Inc. (MIG, Inc.), 2007 Model, 2002 Economic Census and CIC Research, Inc. March 25, 2009

*The three-county EIA is defined as Imperial County, California, Yuma and La Paz counties, Arizona

3.19.5.3.2 USFWS Economic Analysis of PMV Critical Habitat Designation

In 2007, as part of the proposed designation of critical habitat for the PMV and as ordered by the court, the USFWS commissioned a report to identify and analyze the potential economic impacts associated with the proposed designation. The analysis of pre-designation impacts for the report relied on observed visitation data, which indicated that up to a 24 percent decline in visitation could have resulted from the 2000 Administrative Closures (these declines did not occur as predicted based recreation area vehicle counts, which showed a steady increase in visitors through 2007). Incremental economic impacts were considered; however, because no information was available to determine the portion of forecast administrative impacts attributable to critical habitat, the analysis did not forecast incremental administrative costs. Additional research related to public agency cost savings that might have resulted from critical habitat designation confirmed that public cost savings were not likely to occur. The report determined that a significant reduction in the number of OHV trips made to the ISD may adversely impact those businesses dependent on OHV recreational activities and the overall regional economy.

Two analysis scenarios demonstrate that the potential impacts of critical habitat designation were presented in the report. At the lower bound, the analysis assumed that visitation levels would not be affected by closures of portions of the ISD to OHV use. Specifically, the lower bound scenario allowed for various outcomes including the possibility that BLM would chose a management action other than closure of areas, or that OHV recreationists would be able to recreate in other areas without loss in consumer surplus or a change in spending patterns. The upper bound scenario reflected the assumption that, while overall growth in visitation to the ISD would continue, some people who would have made a trip to the recreation area would choose not to do so due to closure of portions of the proposed critical habitat.

Results of the modeling for the report indicated that at the lower bound incremental economic efficiency effects were not expected, no regional economic impacts were forecasted, no economic impacts associated with OHV recreation were expected, and project modification costs were not expected to occur.

At the upper bound, estimated potential economic efficiency effects ranged from \$116 million to \$127 million over the next 20 years. Potential reductions in OHV use within the ISD resulting from PMV critical habitat designation would result in regional economic impacts of \$15.8 million to \$34 million in total output and a total of 345 to 743 jobs over the next 20 years. Efficiency impacts to OHV recreation ranged from \$110 million to \$121 million over the next 20 years. At the upper bound, project modifications were forecasted to total \$5.9 million over the next 20 years. This includes the cost to BLM to install and maintain signage, and enforce the potential closure of portions of critical habitat. The upper bound impacts reflected a potential loss of visitation proportional to

the acres of active dune in each management area that could be closed as a result of the proposed critical habitat. This assumption was based on existing Administrative Closures in addition to the potential critical habitat closures and did not assume management actions by BLM that might open areas currently closed to OHV recreation.

3.19.5.3 Program-specific Sociocultural Conditions

As presented above, the recreation management issue that dominates the Planning Area is the tension between environmental preservation and OHV recreation. These issues have been discussed in some detail in Section 3.19.4—Affected Users and will not be revisited here.

3.19.5.4 Transportation and Public Access

3.19.5.4.1 Routes of Travel and Rights-of-way—Roads

Routes of travel within the Planning Area are illustrated on Map 2-27. There are a total of 228.21 miles of routes of travel (BLM and County) within the Planning Area, including paved and unpaved, and open and limited routes. The majority of annual economic costs for existing ROWs are associated with the maintenance of paved and unpaved roadways. The average annual cost per mile of maintained paved ROW is approximately \$3,000 to \$5,000 per mile. The average cost estimate for this analysis was \$4,000 per mile of paved roadway. The average annual cost for maintenance of unpaved roadways is approximately \$1,500. The estimated annual maintenance for the 228.21 miles of travel routes within the Planning Area yields an annual direct maintenance cost of about \$477,000. Using the IMPLAN model, the baseline economic condition of annual maintenance activities for existing ROWs is listed in Table 3-34.

**TABLE 3-34
BASELINE ECONOMIC CONDITION OF ANNUAL ROADWAY
MAINTENANCE COSTS FOR ROWs WITHIN THE PLANNING AREA**

Baseline Economic Condition—228.21 Miles of Routes of Travel Maintenance			
Category	Direct	Indirect & Induced	Cumulative
Dollar Value	\$477,065	\$276,307	\$753,372
Employment	4.26	2.50	6.76
Labor Income	\$193,302	\$93,699	\$287,002
Property Income	\$25,155	\$42,011	\$67,166
Tax Revenue	\$6,505	\$16,866	\$23,371
Value Added	\$224,962	\$152,576	\$377,539

Source: CIC Research, Inc. and MIG IMPLAN/Pro (base year 2006)

The approximately 228 miles of BLM and County routes of travel within the Planning Area require about \$477,000 direct output within the EIA for annual maintenance. The \$477,000 in annual direct impact generated a total cumulative impact (direct, indirect, and induced) of about \$753,000 in output, including an estimated \$377,000 in total value added. The total value added within the EIA included \$287,000 in labor income, about \$67,000 in property income, more than \$23,000 in tax revenue, and about seven jobs (6.76) in annual employment.

3.19.5.5 Lands and Realty Management

3.19.5.5.1 Baseline Economic Conditions

The baseline economic condition for the lands and realty program focuses on authorizations for communication sites, access roads, renewable energy sites, and other ROWs. The Planning Area is a contiguous area that is roughly 40 miles long and 3 to 12 miles wide.

3.19.5.5.1.1 Utility Corridors

A joint-use utility corridor designated as Corridor L and described in the CDCA Plan crosses from east to west along the southern portion of the Planning Area (Map 2-28, utility corridor map). The CDCA Plan assigned Corridor L a width of 2 to 5 miles. In the Planning Area, the corridor averages about 2 miles wide (see Map 2-28). A 500-kV transmission line, a 161-kV transmission line, and several buried fiber optic networks and telephone lines have been constructed within the corridor. The length of the southern utility corridor crossing the Planning Area is 9 miles.

San Diego Gas and Electric reported that the average cost per mile for maintenance of high-voltage transmission corridors was \$35,000 per mile. The total expected cost for maintenance of the 9-mile San Diego Gas and Electric transmission corridor would be \$315,000 (San Diego Gas & Electric 2007).

A 39-mile utility corridor and UPRR ROW runs along the eastern boundary of the ISD SRMA. This contingency utility corridor is 2 miles wide and can be brought forward into the CDCA Plan after simultaneous plan amendment and EIS on an identified project. The majority of annual economic costs for existing ROWs are associated with the maintenance of paved and unpaved roadways and periodic testing and inspection of buried utilities. The average annual cost per mile for maintenance of the ROW is approximately \$3,000 to \$5,000 per mile. Based on an overall average cost of about \$4,000 per mile, the expected annual maintenance cost for the utility corridor would be about \$156,000 (Table 3-35).

**TABLE 3-35
BASELINE ECONOMIC CONDITION OF THE PLANNING AREA**

Utility Corridor Maintenance Baseline Economic Condition—45.5 Miles of Utility Corridor Maintenance			
Category	Direct	Indirect & Induced	Cumulative
Dollar Value	\$471,000	\$272,795	\$743,795
Employment	4.21	2.47	6.68
Labor Income	\$190,845	\$92,508	\$283,353
Property Income	\$24,835	\$41,477	\$66,312
Tax Revenue	\$6,423	\$16,651	\$23,074
Value Added	\$222,102	\$150,637	\$372,739

Source: CIC Research, Inc. and MIG IMPLAN/Pro (base year 2006)

Maintenance activities for the utility corridors located within the Planning Area require about \$471,000 in annual direct output within the EIA. The \$471,000 in annual direct sales generated a cumulative total impact (direct, indirect, and induced) of about \$743,000 in output, including nearly \$373,000 in total value added. The total value added within the EIA included about \$283,000 in labor income, about \$66,000 in property income, more than \$23,000 in tax revenue, and would generate about 6.7 jobs.

3.19.5.5.1.2 Communication Sites

There are three communication sites within the Planning Area under BLM ROW leases and two small BLM-operated sites which provide communication for BLM staff throughout the Planning Area. Primary users of the communication sites include commercial entities for cellular usage, radio, and TV signals, and other federal government agencies (e.g., USBP and the military). Some city and county governments also have facilities to support their communication needs. Over a five-year period (FY2004–FY2008), BLM-operated communication sites require roughly \$500 per year per facility to operate. The non-BLM communication sites require about \$10,000 per year per facility for maintenance and equipment. Thus, the facilities require approximately \$21,000 in maintenance expenditures on an annual basis. The annual economic value generated by BLM communication facilities represents a very small portion of the Planning Area EIA economy. Using the IMPLAN model for the Planning Area, the baseline economic condition of the annual maintenance and operations for the existing communication facilities are as shown in Table 3-36.

**TABLE 3-36
BASELINE ECONOMIC CONDITION OF COMMUNICATION SITES AND
FACILITIES ON BLM LAND WITHIN THE PLANNING AREA**

Baseline Economic Condition—Communication Facilities			
Category	Direct	Indirect & Induced	Cumulative
Dollar Value	\$21,000	\$12,163	\$33,163
Employment	0.19	0.11	0.30
Labor Income	\$8,509	\$4,125	\$12,634
Property Income	\$1,107	\$1,849	\$2,957
Tax Revenue	\$286	\$ 742	\$1,029
Value Added	\$9,903	\$6,716	\$16,619

Source: CIC Research, Inc. and MIG IMPLAN/Pro (base year 2006)

The communications sites located within the Planning Area require about \$21,000 direct output within the EIA for annual maintenance. The \$21,000 in annual direct sales generated a total cumulative impact (direct, indirect, and induced) of about \$33,000 in output, including an estimated \$16,600 in total value added. The total value added within the Planning Area included \$12,600 in labor income, about \$3,000 in property income, more than \$1,000 in tax revenue, and would generate about one-third of a job (0.30). The annual economic value generated by annual maintenance of communication sites within the Planning Area is an insignificant portion of the \$23.1 billion total output within the EIA economy.

3.19.5.5.1.3 Apiary Permits

Temporary use permits for apiary sites are issued seasonally along the Coachella Canal. These permits generate revenue of about \$0.30 per hive. There are two active apiary permits for a maximum authorized 3,500 hives. These permits are issued on a combined total of eight acres within the Planning Area. Estimated output value per hive is \$65. The total maximum estimated output for 3,500 hives would be \$227,500 (Table 3-37).

**TABLE 3-37
BASELINE ECONOMIC CONDITION FOR APIARY ACTIVITY
WITHIN THE PLANNING AREA**

Economic Impacts of Baseline Condition—3,500 Hives			
Category	Direct	Indirect & Induced	Cumulative
Dollar Value	\$227,500	\$133,298	\$360,798
Employment	2.42	1.14	3.56
Labor Income	\$68,893	\$41,433	\$110,326
Property Income	\$41,807	\$24,008	\$65,814
Tax Revenue	\$6,089	\$6,650	\$12,740
Value Added	\$116,789	\$72,091	\$188,880

Source: CIC Research, Inc. and MIG IMPLAN/Pro (base year 2006)

Apiary activities located within the Planning Area produce a maximum of about \$227,500 in annual direct output within the EIA. The \$227,500 in annual direct sales generated a cumulative total impact (direct, indirect, and induced) of about \$361,000 in output, including \$189,000 in total value added. The total value added within the EIA included about \$110,000 in labor income, about \$66,000 in property income, nearly \$13,000 in tax revenue, and would generate the equivalent of about four jobs annually (3.56). The annual economic value generated by annual apiary production activities within the Planning Area is an insignificant portion of the \$23.1 billion total output within the EIA economy.

3.19.5.5.1.4 Renewable Energy

Renewable energy ROWs on BLM lands are generally issued for solar or wind energy sites, but also include biomass. There are wind and solar resources that have been identified with commercial production potential in the Planning Area. At this time, there is no commercial production of solar energy or wind energy on BLM-administered lands within the Planning Area. Lands available for solar energy development within the Planning Area are identified on Maps 2-29 through 2-32 and encompass a total of 188,833 surface acres. Lands available for wind energy development within the Planning Area are identified on Maps 2-33 through 2-36 and encompass a total of 188,833 surface acres.

Proximity to major electrical distribution systems is a specific requirement for financial feasibility and is dependent on the SEMPRA Energy transmission corridor. If and when a project is proposed to the BLM, the BLM and operator(s) would need to prepare project-specific PODs. Each POD would need to address the potential impacts (including economic and social impacts) of proposed solar or wind energy site leases and development.

Feasible development of solar energy resources within the Planning Area would likely use concentrating solar power (CSP). CSP generation uses several arrays of mirrors to reflect sunlight and concentrate it on an absorber containing a fluid or thermal mass. The heated fluid or mass is then used to boil water into steam, which drives a turbine and then a generator. There are three leading forms of CSP. The first places parabolic trough shaped mirrors (a U-shaped arrangement) with a tube containing synthetic oil running along its focal point, and the oil can be heated to 400 degrees centigrade. The second uses a parabolic dish mirror on which a collector is placed at its focal point. In this configuration, a Stirling engine is the collector, and the heat is converted into electricity at each dish. The third approach uses a central tower with mirrors arranged radially around it. The mirrors direct sunlight to a thermal mass (e.g., molten nitrate salts) that reaches temperatures of 600 degrees centigrade. NREL estimates capital costs of \$2 million to \$5 million per megawatt (MW) to construct a plant. CSPs enjoy low operating and maintenance costs compared to fossil fuel plants. Currently, the price per kilowatt-hour for CSP varies between 13 and 18 cents (Leitner 2002).

3.19.5.5.1.5 Filming on Public Lands

A permit is required for all commercial filming activities on public lands. Commercial filming is defined as the use of motion picture, videotaping, sound recording, or other moving image or audio recording equipment on public lands that involves the advertisement of a product or service, the creation of a product for sale, or the use of actors, models, sets, or props, but not including activities associated with broadcasts for news programs. Public land visitors and recreational, professional, and amateur photographers do not need a permit to take still photographs unless the still photography will use models, sets, or props that are not part of the site's natural or cultural resources or administrative facilities; take place where members of the public are generally not allowed; or will take place at a location where additional administrative costs are likely.

Special permits to use the public lands for commercial film production are issued by the BLM under Section 302(b) of FLPMA. Regulations governing filming on public lands are covered in 43 CFR 2920, leases permits, and easements. During the four-year period of 2005 through 2008 there were a total of 56 filming permits issued (excluding cancelled permits). More than one-third (36 percent) of the permits were issued for still photography and were mainly in support of commercial print ads. The second largest category was student filming permits, which represented about 18 percent of the permits issued. The balance of the permits included documentaries, commercials, TV episodes, and features. Some of the photo shoots and filming activities required up to 80 people (actors and crew) on-site.

The film permit data indicated an average of 14 permits per year, with a total film/photo crew of 230 people. Based on the California Film Commission production cost guidelines the average annual total expense for these film permit activities was about \$315,000 of which about \$110,000 was spent in the Planning Area EIA. The \$110,000 in annual

direct impact generated a total cumulative impact (direct, indirect, and induced) of about \$175,000 in output, including an estimated \$102,000 in total value added. The total value added within the EIA included about \$72,000 in labor income, about \$20,000 in property income, about \$9,000 in tax revenue, and would generate about 3 jobs (3.2) in annual employment. The annual economic value generated by commercial filming and photography activities within the Planning Area is an insignificant portion of the EIA economy (Table 3-38).

**TABLE 3-38
BASELINE ECONOMIC CONDITION FOR FILMING WITHIN
THE PLANNING AREA**

Baseline Economic Condition—14 Filming Permits per Year			
Category	Direct	Indirect & Induced	Cumulative
Dollar Value	\$110,250	\$64,308	\$174,558
Employment	2.60	0.60	3.20
Labor Income	\$49,594	\$22,774	\$72,368
Property Income	\$9,351	\$11,104	\$20,455
Tax Revenue	\$5,501	\$3,370	\$8,872
Value Added	\$64,446	\$37,249	\$101,695

Source: CIC Research, Inc. and MIG IMPLAN/Pro (base year 2006)

3.19.5.5.2 Program-specific Sociocultural Conditions

The Planning Area is a primary OHV recreational resource for an increasing number of people living in the region. While OHV recreationists come from all walks of life and socioeconomic statuses, they are primarily middle income. In their occupations, politics, religions, and residential patterns, they may have little in common; with regard to sand dunes recreation, they share a great deal. Some call themselves Duners and refer to their sport as duning (Brunasso 2009a). Actually riding or driving in the sand dunes is only one of the aspects that draw people to the Planning Area. Other attractions include camping with family and friends, experiencing the sand dune environment, and exploring the sand dunes. The primary lands and realty concern for the Duners is access to the sand dunes for recreational activities. Miscellaneous ROWs, utility ROWs, land tenure, communication sites, and land use permits and other withdrawals are generally not applicable to the sand dune environment or of little interest. However, because of the OHV community's strong concern about further withdrawals from sand dune recreation areas, many may be resistant to withdrawals elsewhere.

Other major visitor groups to the Planning Area include Native Americans and environmentalists. Both of these groups tend to believe that a larger fraction of the Planning Area, or all of it, should be left alone and/or restored to its natural state. The Quechan tribe, whose traditional lands were contiguous with the sand dunes, seems to

come to that position from their traditional belief in stewardship of the land and their spiritual relationship to the land. Environmentalists seem to have arrived at a belief in preservation from a natural science perspective.

3.19.5.6 Summary of Resource Programs

3.19.5.6.1 Baseline Economic Conditions

Measurable economic activity was identified for three BLM resource programs within the Planning Area: recreation management, transportation and public access, and lands and realty management. The total annual direct economic output activity for these BLM resource programs was about \$112 million annually (Table 3-39). The total cumulative economic output (direct, indirect, and induced) was an estimated \$171 million per year. The \$171 million in cumulative total output included an estimated \$109 million in total value added within the Planning Area, including more than \$67 million in labor income (wages and salaries), and generated a total of 2,139 jobs. The annual economic value supported by BLM-administered Planning Area land represented a little less than one percent of the total regional output of the three-county Planning Area EIA.

**TABLE 3-39
SUMMARY OF THE BASELINE ECONOMIC CONDITION:
PLANNING AREA TOTAL CUMULATIVE IMPACT**

Baseline Economic Condition—Summary of Planning Area Land Uses			
Category	Direct	Indirect & Induced	Cumulative
Dollar Value	\$113,419,712	\$59,001,666	\$172,421,378
Employment	1,636	521	2,139
Labor Income	\$47,942,825	\$20,212,799	\$68,155,624
Property Income	\$13,072,563	\$10,652,209	\$23,724,722
Tax Revenue	\$14,873,195	\$3,305,764	\$18,122,099
Value Added	\$75,888,635	\$34,170,791	\$109,182,525

Source: CIC Research, Inc. and MIG IMPLAN/Pro (base year 2006)

3.19.5.6.2 Program-specific Sociocultural Conditions

The Planning Area is used primarily by six types of stakeholders. In order of their numbers, they are:

- The OHV community
- The environmental community (e.g., hikers, birdwatchers)
- On-site vendors
- Business owners in nearby communities

- Community representatives
- Quechan Tribe

OHV enthusiasts stress the value of their recreation experience and socio-cultural significance of the OHV lifestyle. Some call themselves Duners (Brunasso 2009a). OHV enthusiasts mention that riding and/or driving dune vehicles is not the only dune attraction. They express that camping, fellowship, and being in the dune environment are important recreational factors. Their primary recreation management concern is continued access to the sand dunes. However, many have expressed concerns with safety, alcohol and drug abuse, and disruptive behavior within the Planning Area (Brunasso 2009b).

Environmentalists are defined more by their interests and values than by their participation in particular activities. The activities that environmentalists participate in include camping, hiking, and observing nature. They typically mention being attracted to the sand dune recreational experience by the solitude, quiet, the unique plants of the dunes, and the beautiful dune landscape. Their primary expressed concerns have to do with threats to the natural dune landscape and the native plants and animals. They typically perceive OHV activities as a threat to the natural dunescape and generally support the notion of more wilderness and less open area for OHVs.

On-site vendors express a variety of concerns regarding BLM rules, particularly the rule that makes them break camp and move out every week. They suggest that they should be allowed to set up and live within the Planning Area during the OHV season. This would help them provide better services and a wider range of products to the OHV community.

OHV-related business owners in nearby communities strongly support the OHV activities within the Planning Area and oppose restrictions on the use of the dunes. They strongly support the OHV community. Some community-based businesses are in competition with the vendors within the Planning Area and would like to see more restrictions on them. Community-based business owners feel they are in unfair competition with the on-site vendors.

The Quechan Tribe has strong cultural and spiritual ties to the sand dunes. They are reasonably happy with the balance between preservation and open OHV areas. However, they are concerned about the plants and animals of the dunescape and the safety of the OHV recreationists.

All Planning Area user communities are becoming increasingly familiar with the management of these resources, and increasingly aware of the existence and views of other user types. There is more of a discussion among user types and less diatribe than in previous years.

3.20 Environmental Justice

Beginning in the 1990s, the concept of environmental justice came to widespread public attention. Concern has developed over environmental justice issues among advocates for low-income and minority communities. In general terms, the focus of environmental justice is on disproportionate adverse environmental impacts on low-income communities and minority communities in the United States. These impacts and the nature of disadvantaged communities are difficult to measure. However, a number of EOs and policy initiatives have attempted to address environmental justice concerns.

EO 12898 is entitled *Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations*. The executive order was issued by President Clinton on February 11, 1994. The order requires federal agencies to identify minority and low-income populations, and ascertain whether or not disproportionately high and adverse health or environmental effects might result from their programs, policies, and activities. Subsequently, the EPA defined environmental justice as fair treatment and meaningful involvement of all people regardless of their race, color, national origin, or income in the development, implementation, and enforcement of environmental laws, regulations, and policies. The Office of Environmental Justice coordinates the EPA's efforts to integrate environmental justice into all policies, programs, and activities. The EPA also established the National Environmental Justice Advisory Council to incorporate environmental justice into federal environmental health research, environmental law enforcement, environmental penalty assessment, environmental rulemaking, and facility location decisions.

EO 13045 is entitled *Protection of Children from Environmental Health Risks*. It requires that federal agencies assess the environmental, health, and safety risks that may disproportionately affect children. Thus, disproportional impacts to children are now considered under environmental justice.

According to the CEQ environmental justice guidelines, minority populations should be identified when the minority population percentage either exceeds 50 percent or the minority population is meaningfully greater than the minority population in the general population or in a meaningful geographic area. While we lack specific demographic data on the ethnicity of visitors to the Planning Area, field observations suggest they are overwhelmingly White. This is in contrast to the population of surrounding Imperial County, which, in the 2000 census, had approximately 27 percent Whites and 70 percent Hispanics. Similarly, ethnicity data are not available for the environmental community, but field observations suggest it also appears to be overwhelmingly White in southern California. The primary management issue within the Planning Area is how to strike a balance between environmental concerns and OHV access/recreation. Expansion of wilderness is generally supported by environmentalists and the opposite, expansion of open OHV areas, is supported by the OHV community.

The Quechan Tribe is a minority ethnicity with interests in the Planning Area. Previous fieldwork suggests that they are reasonably happy with the present balance between preservation and OHV access/recreational use (Russell et al. 2002).

3.20.1 Minority and Low-income Communities

As presented in the discussion of environmental justice above, the BLM is aware that there are small pockets of poverty and/or minority populations scattered throughout the region of the Planning Area. However, the BLM has not identified any communities within the Planning Area with low income or minority populations that are disproportionately impacted by the existing land use activities and policies for BLM-administered lands.