**FINAL**

# ENVIRONMENTAL ASSESSMENT FOR THE INTEGRATED CULTURAL RESOURCES MANAGEMENT PLAN FOR EDWARDS AIR FORCE BASE, CALIFORNIA

**July 2005**

**95TH AIR BASE WING**
**CIVIL ENGINEER DIRECTORATE**
**ENVIRONMENTAL MANAGEMENT DIVISION**
**EDWARDS AFB CA**

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Environmental Assessment for the Integrated Cultural Resources Management Plan for
Edwards Air Force Base, California
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Prepared by:

**JT3/CH2M HILL**
**FLIGHT TEST SUPPORT CENTER**

The views, opinions, and findings contained in this report are those of the author(s) and should not be construed as an official Department of the Air Force, Air Force Materiel Command (AFMC), position, policy or decision, unless so designated by other documentation.

For:
95th Air Base Wing
Civil Engineer Directorate
Environmental Management Division
Edwards Air Force Base, California

# FINDING OF NO SIGNIFICANT IMPACT FOR THE INTEGRATED CULTURAL RESOURCES MANAGEMENT PLAN FOR EDWARDS AIR FORCE BASE, CALIFORNIA

## 1.0 INTRODUCTION

The 95th Air Base Wing (95 ABW) Commander of Edwards Air Force Base (AFB), in coordination with the United States National Park Service and the California Department of Parks and Recreation Office of Historic Preservation proposes to manage the cultural resources on Edwards AFB by developing and implementing an Integrated Cultural Resources Management Plan (ICRMP).

Under alternative A (the proposed action), an ICRMP would be developed and implemented in an attempt to enhance and preserve cultural resources with minimal impact to the base environment. Under this alternative, cultural resources sites would be managed with moderate intensity, utilizing predictive modeling and sampling techniques to cover the base and future activities. This alternative is characterized by an active approach to identifying, documenting, and occasionally preserving cultural sites with little or no environmental impacts. The proposed action would contain, but not be limited to: surveying/identifying additional cultural resources sites; excavating and recovering data in archaeological/historically significant sites; maintaining structures of historical significance; researching and writing cultural resources reports; limiting public access and reducing the risk of vandalism, involving additional Security Forces, Civil Engineering, and various training squadrons; and using the Geographic Information System (GIS) to help locate cultural resources sites, including the ability to overlay culturally sensitive areas on top of base infrastructure maps.

Under alternative B, an ICRMP would be developed to further utilize additional resources: including increased funding, personnel, and environmental impacts. Alternative B would include increased intensities of cultural resources management, specifically targeted to areas as outlined in alternative A. Alternative B would also include areas of lower probability of cultural/historical significance and those areas not yet surveyed. Specific cultural areas determined to have a higher probability of cultural significance would have a higher potential for investigation through physical survey, increased evaluation, and excavation activities. This alternative uses significantly higher levels of management practices, as opposed to the predictive modeling of alternative A, to actively identify cultural areas of concern and significance. Under this alternative, areas of the base would be culturally cleared for future projects.

Under alternative C, no change in management direction or intensity would be proposed. Existing conditions and management practices would continue and no new initiatives would be established. Alternative C represents a low level of active management and would not provide a fully integrated approach. Under this alternative, the base's cultural resources management activities would continue to be carried out at a relatively low intensity and preservation would be managed and carried out on a project-by-project basis. Edwards AFB would continue to comply with all applicable federal, state, and local laws and regulations; however, only minimal actions, as required by the various cultural resources-related policies and laws would be accomplished. This alternative would manage the cultural resources on the base through the section 106 process of the *National Historic Preservation Act* (NHPA) and would not include additional activities through

section 110 of the NHPA. This alternative would manage cultural resources on a project-driven, or as-needed, basis.

The Environmental Assessment (EA) documents the analysis of the activities required for implementation of an ICRMP and supports this finding.

## 2.0 ENVIRONMENTAL EFFECTS

The components of the natural and manmade environment analyzed for potentially significant impacts include: Land Use, Air Quality, Safety and Occupational Health, Biological Resources, Cultural Resources, Geology and Soils, and Socioeconomics. No potentially significant impacts were identified in any of these areas.

## 3.0 FINDINGS

A Finding of No Significant Impact (FONSI) for the Proposed Action and alternatives has been determined based on the absence of significant adverse impacts to the environment. Background information that supports the research and development of this FONSI and the EA is on file at Edwards AFB and can be obtained by contacting the following:

95th Air Base Wing
Civil Engineer Directorate
Environmental Management Division
Attn: Mr. Gary Hatch
5 East Popson Avenue, Building 2650A
Edwards AFB CA 93524-8060
(661) 277-1454

James E. Judkins
JAMES E. JUDKINS
Base Civil Engineer

15 July 05
Date

# COVER SHEET

## ENVIRONMENTAL ASSESSMENT FOR THE INTEGRATED CULTURAL RESOURCES MANAGEMENT PLAN FOR EDWARDS AIR FORCE BASE, CALIFORNIA

a. Lead Agency: U.S. Air Force

b. Cooperating Agency: None

c. Proposed Action: Environmental Assessment for the Integrated Cultural Resources Management Plan for Edwards Air Force Base, California

d. Inquiries on this document should be directed to the 95th Air Base Wing, Civil Engineer Directorate, Environmental Management Division (95 ABW/CEV), Attn: Gary Hatch, 5 East Popson Avenue, Building 2650A, Edwards AFB CA 93524-8060, (661) 277-1454 or e-mail gary.hatch@edwards.af.mil.

e. Designation: Final Environmental Assessment (EA)

f. Abstract: Pursuant to the *National Environmental Policy Act of 1969*, this EA has been prepared in order to analyze the potential environmental consequences of the proposed action. The proposed project would involve management of the cultural resources on Edwards Air Force Base through the implementation of a targeted Integrated Cultural Resources Management Plan (ICRMP). The analysis in this EA illustrates that none of the environmental impacts from the proposed action will be significant if the required/recommended minimization measures are followed.

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## LIST OF ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| 412 TW/LGQ | 412th Test Wing Quality Assurance Inspection Branch |
| 95 ABW | 95th Air Base Wing |
| AB | Assembly Bill |
| AF | Air Force |
| AFB | Air Force Base |
| AFFTC | Air Force Flight Test Center |
| AFFTCI | Air Force Flight Test Center Instruction |
| AFI | Air Force Instruction |
| AFJMAN | Air Force Joint Manual |
| AFOSH | Air Force Occupational Safety and Health |
| AFPD | Air Force Policy Directive |
| AFRL | Air Force Research Laboratory |
| AIRFA | American Indian Religious Freedom Act |
| APE | Area of Potential Effect |
| APCD | Air Pollution Control District |
| AQMD | Air Quality Management District |
| ARPA | Archaeological Resources Protection Act |
| ATC | Authority to Construct |
| AVAQMD | Antelope Valley Air Quality Management District |
| BACT | Best Available Control Technology |
| BHPO | Base Historic Preservation Officer |
| BLM | Bureau of Land Management |
| CAA | Clean Air Act |
| CAAA | Clean Air Act Amendments |

**LIST OF ABBREVIATIONS AND ACRONYMS (Continued)**

| | |
|---|---|
| CAAQS | California Ambient Air Quality Standards |
| Cal-OSHA | California Occupational Safety and Health Administration |
| CAR | Combat Arms Range |
| CARB | California Air Resources Board |
| CATEX | categorical exclusion |
| CCAA | California Clean Air Act |
| CCR | California Code of Regulations |
| CDFG | California Department of Fish and Game |
| CEQ | Council on Environmental Quality |
| CEQA | California Environmental Quality Act |
| CFR | Code of Federal Regulations |
| CNPS | California Native Plant Society |
| CO | carbon monoxide |
| CS | California species of special concern |
| dB | decibel |
| DOD | Department of Defense |
| DODD | Department of Defense Directive |
| DODI | Department of Defense Instruction |
| EA | Environmental Assessment |
| EIAP | Environmental Impact Analysis Process |
| EIR | economic impact region |
| EIS | Environmental Impact Statement |
| EO | Executive Order |
| EOD | Explosive Ordnance Disposal |

**LIST OF ABBREVIATIONS AND ACRONYMS (Continued)**

| | |
|---|---|
| ERP | Environmental Restoration Program |
| ESA | Endangered Species Act |
| FOD | foreign object damage |
| FONSI | Finding of No Significant Impact |
| FS | Forest Service |
| FSS | Bureau of Land Management/Forest Service sensitive |
| FT | Federally threatened |
| GIS | Geographic Information System |
| HAP | Hazardous Air Pollutant |
| HASP | Health and Safety Plan |
| HQA | Habitat Quality Analysis |
| IAW | in accordance with |
| ICE | internal combustion engine |
| ICRMP | Integrated Cultural Resources Management Plan |
| IMT | Information Management Tool |
| INRMP | Integrated Natural Resources Management Plan |
| KCAPCD | Kern County Air Pollution Control District |
| MBTA | Migratory Bird Treaty Act |
| MDAB | Mojave Desert Air Basin |
| MDAQMD | Mojave Desert Air Quality Management District |
| MOU | Memorandum of Understanding |
| mph | miles per hour |
| NAAQS | National Ambient Air Quality Standards |
| NAGPRA | Native American Graves Protection and Repatriation Act |

**LIST OF ABBREVIATIONS AND ACRONYMS (Continued)**

| | |
|---|---|
| NEPA | National Environmental Policy Act |
| NESHAP | National Emission Standards for Hazardous Air Pollutants |
| NHPA | National Historic Preservation Act |
| $NO^2$ | nitrogen dioxide |
| $NO_x$ | nitrogen oxides |
| NPS | National Park Service |
| NRCS | Natural Resource Conservation Service |
| NSR | new source review |
| $O_3$ | ozone |
| ORV | off-road vehicle |
| OSHA | Occupational Safety and Health Administration |
| OU | Operable Unit |
| PIRA | Precision Impact Range Area |
| PM2.5 | particulate matter equal to or less than 2.5 microns |
| PM10 | particulate matter equal to or less than 10 microns |
| PTE | potential to emit |
| PTO | Permit to Operate |
| Pb | lead |
| ppm | parts per million |
| SCS | Soil Conservation Service |
| SEA | Significant Ecological Area |
| SE | State of California Endangered |
| SHPO | State Historic Preservation Office |
| SIP | State Implementation Plan |

## LIST OF ABBREVIATIONS AND ACRONYMS (Concluded)

| | |
|---|---|
| $SO^2$ | sulfur dioxide |
| $SO_x$ | sulfur oxides |
| ST | State of California threatened |
| TAC | toxic air contaminants |
| TSE | technical support equipment |
| USACE | United States Army Corps of Engineers |
| USAF | United States Air Force |
| USC | United States Code |
| USDA | United States Department of Agriculture |
| U.S. EPS | United State Environmental Protection Agency |
| USFWS | United States Fish and Wildlife Service |
| UXO | unexploded ordnance |
| VOC | volatile organic compounds |
| 1B | CNPS plants rare, threatened, or endangered in California |

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# 1.0 INTRODUCTION

## 1.1 Purpose and Need

The 95th Air Base Wing (95 ABW) Commander of Edwards AFB, in coordination with the United States National Park Service and the California Department of Parks and Recreation, Office of Historic Preservation proposes to manage the cultural resources on Edwards AFB by developing and implementing an Integrated Cultural Resources Management Plan (ICRMP).

Air Force Instruction (AFI) 32-7065 and Department of Defense Instruction (DODI) 4715.3 require every military base to have an ICRMP. This 5-year ICRMP is a component of the Base Master Plan (AFFTC 2001a) and is the 95 ABW Commander's decision document for cultural resources management actions and for specific cultural resources compliance procedures. Cultural resources are buildings, structures, sites, districts, and objects that may be eligible for or included in the *National Register of Historic Places* (DODI 4715.3). Integrated Cultural Resources Management Plans are internal Air Force (AF) compliance and management plans. They integrate the entirety of the base cultural resources program with ongoing mission activities, allow for ready identification of potential conflicts between the base's mission and cultural resources, and identify compliance actions necessary to maintain the availability of mission-essential properties and acreage. They supersede and replace Cultural Resources Management Plans and are updated annually and revised every 5 years.

## 1.2 Objectives

The ICRMP emphasizes a continued cultural resources management approach by coordinating cultural resources management activities on Edwards AFB with the AF mission.

One goal of the management approach is to protect the properties and functions of cultural resources. The base's cultural resources management would also include coordination and partnerships with agencies/Indian tribes that have cultural resources interests within the base boundaries to achieve a balance between resource users, develop mechanisms to establish and maintain partnerships, and establish an enhanced cultural resources education program.

A second goal of the management approach is designed to minimize impacts to the military mission. A third goal is designed to meet compliance requirements and identify, enhance, and implement program efficiencies.

The ICRMP would highlight the following:

a. Cultural Approach – As the information base becomes more complete, the ICRMP would continue to shift focus from inventorying and identifying individual sites, to evaluating and managing cultural resources.

b. Partnerships – The ICRMP would enable partnerships to achieve shared goals. Resources extend across political boundaries, making the need for cooperation, coordination, and partnerships essential for their effective management.

c. Participation – The ICRMP would include public involvement and incorporate the public's needs and desires into management decisions.

d. Information – The ICRMP would use the best available scientific and field-tested information available in the decision-making process and select the most appropriate technologies for management of cultural resources.

e. Adaptive Management – Resource managers would implement adaptive management techniques, as they become known, through applying the best available commercial and scientific techniques.

Major cultural resources management activities at Edwards AFB include: identification of new prehistoric and historic sites, documentation, possible excavation of sites, and archiving of cultural resources artifacts and data.

## 1.3 Location and Scope of the Proposed Action

Edwards AFB is located in the Antelope Valley region of the western Mojave Desert in Southern California. It is about 60 miles northeast of Los Angeles, California. The base occupies an area of approximately 301,000 acres or 470 square miles. Portions of the base lie within Kern, Los Angeles, and San Bernardino counties (figure 1). Proposed project activities would be located throughout the base.

## 1.4 Issues and Concerns

### 1.4.1 Issues and Concerns Studied in Detail

During the scoping process, the following issues and concerns were identified as requiring assessment when considering the potential environmental impacts of the alternatives. They are considered the primary issues of concern.

a. Land Use – Cultural resources management must consider both local and regional plans to ensure cooperation and to increase the potential for success.

b. Air Quality – Cultural resources management activities would cause short-term degradation in air quality. Vehicles would generate criteria pollutants when transporting personnel to and from excavation and investigation activities. Excavation activities have the potential to generate fugitive dust.

c. Safety and Occupational Health – Cultural resources archaeological sites and buildings have the potential to be located in Environmental Restoration Program (ERP) sites, on the flightline, Precision Impact Range Area (PIRA), Combat Arms Range (CAR), or Air Force Research Laboratory (AFRL). Personnel could potentially be exposed to hazardous noise; conditions that can cause heat stress, hypothermia, snake and spider bites, and contracting hantavirus and/or valley fever from exposure to soils hosting spores; and hazardous materials and waste.

d. An additional safety concern at Edwards AFB for any ground-disturbing activity is the presence of unexploded ordnance (UXO). Lead may be present in the soils on the CAR and PIRA.

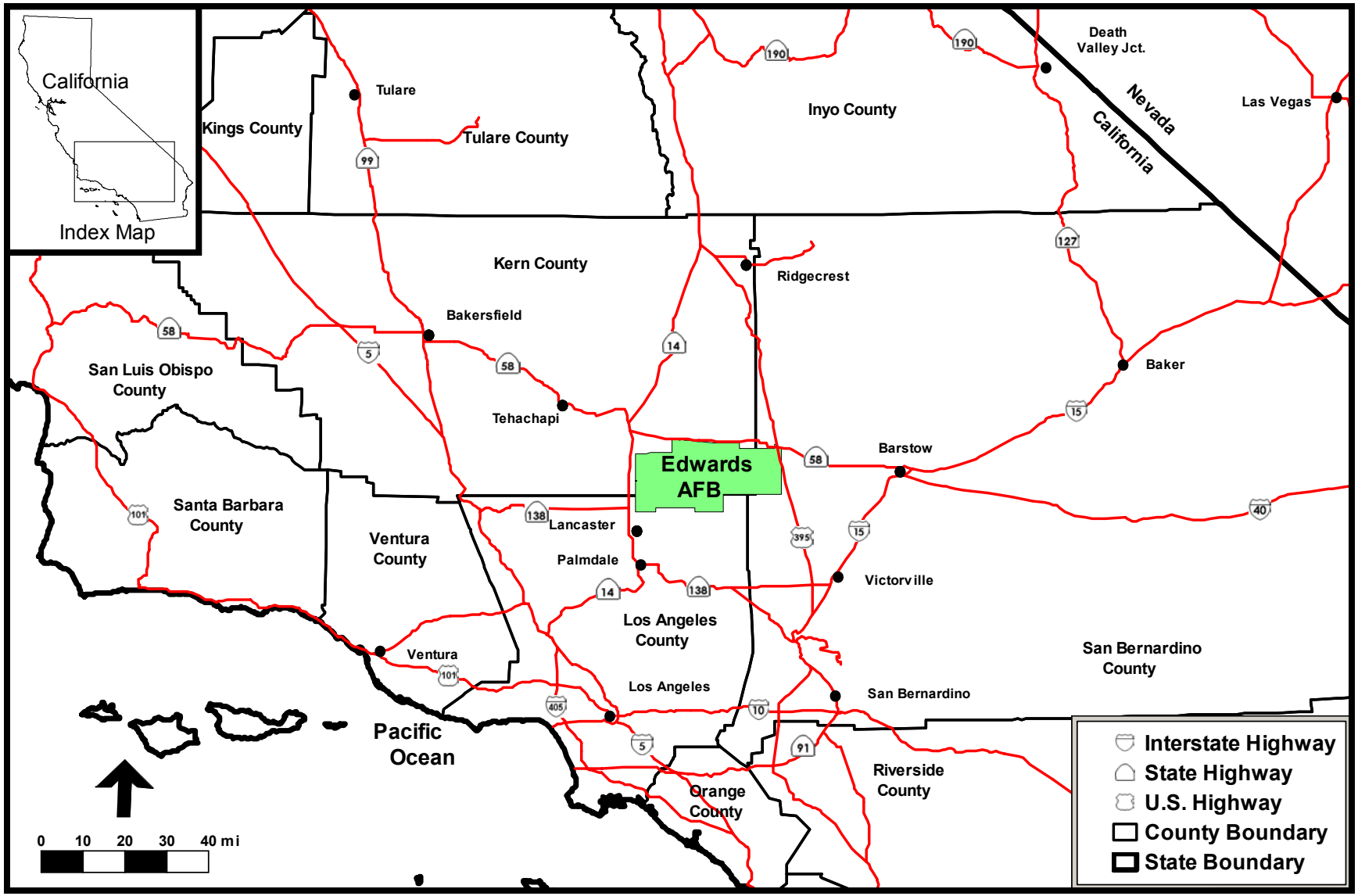



**Figure 1 General Vicinity Map**

e. Biological Resources – Ground-disturbing activities associated with cultural resources management activities and equipment have the potential to impact wildlife and vegetation.

f. Cultural Resources – Cultural resources management activities have the potential to impact adjacent or nearby properties of prehistoric, historic, archaeological, or architectural significance or American Indian sites. Long-term positive impacts would result from active cultural resources management activities on base.

g. Geology and Soils – Cultural resources management activities have the potential to create soil erosion as well as disturb soil during excavation activities. Cultural resources management activities may also have the potential to impact or impede ERP site remediation.

h. Socioeconomic – Cultural resources management activities would likely generate revenue into the local economy.

### 1.4.2 Issues and Concerns Eliminated From Detailed Study

The following issues and concerns were initially considered, but subsequently eliminated from further consideration in this Environmental Assessment (EA):

a. Water Resources – No water changes are anticipated to support proposed cultural resources management activities. There are no jurisdictional waters or "Waters of the United States" located within the project area. Therefore, there is no potential for adverse impact to the *Clean Water Act* (33 United States Code [USC] 1251 et seq.).

b. Hazardous Materials and Waste – No cultural resources management activities would require the use of hazardous materials and/or the generation of hazardous or solid waste.

c. Environmental Justice and Protection of Children – The Executive Orders (EOs) on environmental justice and the protection of children require federal agencies to identify and address disproportionately high adverse effects of its activities on minority and low-income populations and children. This action has been reviewed in accordance with (IAW) EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, and EO 13045, *Protection of Children from Environmental Health and Safety Risks*. Given that the activities proposed in the ICRMP would occur entirely on base, the United States Air Force (USAF) has determined that this action has no substantial disproportionate impact to minority, low-income populations, and/or children.

## 1.5 Regulatory Requirements, Permits, and Approvals

### 1.5.1 Regulatory Requirements

This EA has been prepared in order to comply with the *National Environmental Policy Act of 1969* (NEPA) and the Council on Environmental Quality (CEQ) regulations implementing NEPA. This document is intended to fulfill the requirements for compliance with title 40 Code of Federal Regulations (CFR) parts 1500–1508 and AFI 32-7061, *The Environmental Impact Analysis Process*, the applicable AFI for implementing NEPA. Air Force Instruction 32-7061 completely adopts Title 32 CFR Part 989, *Environmental Impact Analysis Process (EIAP)*.

### 1.5.2 Permits and Approvals

The proposed project may require permits and/or approvals from other federal, Indian tribes, state, and/or local agencies, or various base offices depending upon the extent of the work proposed and/or type of equipment used. The contractor performing the work is responsible for obtaining the relevant permits and accomplishing any required notification. Environmental permitting requirements for all work on base are coordinated through Environmental Management. However, as permitting requirements change, others may be required. The following permits would be required for some Phase II and III evaluations:

a. An Air Force Flight Test Center (AFFTC) Information Management Tool (IMT) 5926, *Edwards AFB Civil Engineering Work Clearance Request* (Digging Permit), is required for any ground-disturbing activities that extend 12 or more inches below the ground's surface.

b. Intensive project activities may require an AF Form 813, *Request for Environmental Impact Analysis*.

## 1.6 Related Environmental Documents

A number of related environmental documents have been prepared and approved that address activities related to the ICRMP. These documents contain information used in the preparation of this EA. A listing of these documents follows:

a. *Environmental Assessment for the Integrated Natural Resources Management Plan, Edwards Air Force Base, California* (AFFTC 2001b).

b. *Integrated Cultural Resources Management Plan Update* (AFFTC 2004a).

c. *Environmental Assessment for the Continued Use of the Precision Impact Range Area (PIRA), Edwards Air Force Base, California* (AFFTC 1996).

d. *Programmatic Environmental Assessment of Propulsion Testing Capabilities at the Phillips Laboratory, Edwards Air Force Base, California* (AFFTC 1998).

e. *Cultural Resources Overview and Management Plan for Edwards AFB, California, Volume 1: Overview of Prehistoric Cultural Resources* (Earle et al. 1997).

f. *Cultural Resources Overview and Management Plan of Edwards AFB, California Volume 2, Overview of Historic Cultural Resources* (Earle et al. 1998).

g. *Cultural Resources Overview and Management Plan for Edwards AFB, California, Volume 3: Cultural Resources Management Plan* (Ronning et al. 2000).

## 1.7 Future Use of This Document

The implementation of the ICRMP would require activities, such as surveying, monitoring, testing, and excavating that may affect the environment. Future undertakings documented in the EIAP measures would be reviewed and evaluated to determine if they fall within the scope of this EA. The activities covered in this analysis are by definition considered routine and reoccurring and would qualify for a categorical exclusion (CATEX). In the event that a future action is

determined to fall within the scope of this EA and no new environmental impacts would occur as a result of the future action, a CATEX would be prepared once the EIAP process is initiated. A CATEX could also be prepared for future undertakings that would result in minor impacts not discussed in this EA if impacts could be reduced to insignificant levels through minimization. In some cases, a supplement to this EA may be required. In this case, a new Finding of No Significant Impact (FONSI) would be required. Future undertakings that are found to result in significant impact to the environment that could not be minimized to less than significant levels would need to be addressed in an Environmental Impact Statement (EIS).

## 1.8 Organization of this Environmental Assessment

This EA consists of seven sections and one appendix and are summarized accordingly.

a. Section 1.0, Introduction – Describes the underlying purpose and need for the proposed action.

b. Section 2.0, Description of the Proposed Action and Alternatives – Describes the alternatives and summarizes the alternative analysis, including the environmental consequences of the alternatives.

c. Section 3.0, Affected Environment – Describes the existing (affected) environment at Edwards AFB and the surrounding area.

d. Section 4.0, Environmental Consequences – Discusses the environmental impact of the proposed action, including any adverse environmental effects that cannot be avoided, the relationship between short-term uses of the human environment and the maintenance and enhancement of long-term productivity including cumulative effects resulting from actions taken, and any irreversible or irretrievable commitment of resources that would be involved in the proposed action.

e. Section 5.0, References – Provides the references cited throughout the document.

f. Section 6.0, List of Preparers and Reviewers – Lists the persons who were primarily responsible for preparing and reviewing this EA.

g. Section 7.0, List of Agencies and Organizations to Whom Copies of the Environmental Assessment Are Sent – Lists the various agencies and organizations, to whom copies of the EA are sent.

h. Appendix A, Air Calculations and Conformity Letter – provides air emission calculations and the air conformity letter.

## 2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The issue to be analyzed in this EA is how the cultural resources at Edwards AFB would be managed. The 95 ABW Commander of Edwards AFB, in coordination with the State Historic Preservation Officer (SHPO), proposes to manage the cultural resources on Edwards AFB by developing and implementing an ICRMP. This section describes alternative plans to meet this need: Alternative A – Targeted Management Plan, Alternative B – High Intensity Management Plan, and Alternative C – the Minimal Intensity Management Plan (No Action Alternative).

### 2.1 Alternative A – Targeted Management Plan (Proposed Action)

Under this alternative, an ICRMP would be developed and implemented in an attempt to enhance and preserve cultural resources with minimal impact to the base environment. Under this alternative, cultural resources sites would be managed with moderate intensity, utilizing predictive modeling and sampling techniques to cover the base and future activities. This alternative is characterized by an active approach to identifying, documenting, and occasionally preserving cultural sites with little or no environmental impact. Limited short-term environmental impact could possibly occur, and would adhere to the NEPA process. The proposed action would contain, but not be limited to:

a. Surveying/identifying additional cultural resources sites;

b. Excavating and recovering data in archaeological/historical sites;

c. Maintaining structures of historical significance;

d. Researching and writing cultural resources reports;

e. Limiting public access and reducing the risk of vandalism, involving additional Security Forces, Civil Engineering, and various squadrons; and

f. Using the Geographic Information System (GIS) to help locate cultural resources sites, including the ability to overlay culturally sensitive areas on top of base infrastructure maps.

### 2.2 Alternative B – High Intensity Management Plan

Under this alternative, an ICRMP would be developed to further utilize additional resources, including increased funding, personnel, and environmental impacts. Alternative B would include increased intensities of cultural resources management, specifically targeted to areas as outlined in alternative A. Alternative B would also include areas of lower probability of cultural/ historical significance and those areas not yet surveyed. (Specific cultural areas determined to have a higher probability of cultural significance would have a higher potential for investigation through physical survey, increased evaluation, and excavation activities.) This alternative uses significantly higher levels of management practices, as opposed to the predictive modeling of alternative A, to actively identify cultural areas of concern and significance. Under this alternative, areas of the base would be culturally cleared for future projects.

This alternative is characterized by more cultural projects than alternative A. Additional increased environmental impacts would occur due to the increased number of projects to be

evaluated. More projects to survey, evaluate, and excavate; the use of assertive practices (e.g., increased activity in sensitive areas); and additional resource requirements are all components of this alternative.

## 2.3 Alternative C – Minimal Intensity Management Plan (No Action)

Under this alternative, no change in management direction or intensity would be proposed. Existing conditions and management practices presented in Section 3.0, Affected Environment, would continue and no new initiatives would be established. The Minimal Intensity Management Plan, using existing plans, represents a low level of active management and would not provide a fully integrated approach. Under the Minimal Intensity Management Plan, the base's cultural resources management activities would continue to be carried out at a relatively low intensity and preservation would be managed and carried out on a project-by-project basis. Under this alternative, Edwards AFB would continue to comply with all applicable federal, state, and local laws and regulations; however, only minimal actions, as required by the various cultural resources-related policies and laws would be accomplished. This alternative would manage the cultural resources on the base through the section 106 process of the NHPA and would not include additional activities through section 110 of the NHPA. This alternative would manage cultural resources on a project-driven, or as-needed, basis.

This alternative is characterized by compliance monitoring to conserve cultural resources: no systematic preservation of high priority areas, very limited enhanced cultural resources management, and minimalist in approach. Limited short-term environmental impact could possibly occur, and would adhere to the NEPA process.

## 2.4 Criteria for Selection of a Reasonable Range of Alternatives

The criteria identified in this section establish a minimum set of requirements that must be met in order for an alternative to be considered viable. The alternative that best meets all the criteria will be selected to fulfill the proposed action. The criteria used to select the alternatives discussed in this document are described in this section. Any aspect of an alternative plan that would exceed the criteria would be considered as a potentially "significant impact" as defined by CEQ. They include:

a. Technical

   1) The selected alternative must comply with AFI 32-7065, *Cultural Resources Management*.

   2) The alternative must have the capability to support and not interfere with the mission of the AF at Edwards AFB.

   3) The goals and objectives should be technically feasible.

   4) The alternative must be logistically effective.

b. Environmental

   1) A maximum amount of undisturbed area must be retained.

   2) The extent of environmental impacts must be minimized.

c. Economic

1) The alternative must be cost effective.

## 2.5 Alternatives Considered But Dismissed From Further Consideration

Plans can be developed with an almost infinite number of variations. The three alternatives selected for evaluation represent a low, medium (targeted), and high level of cultural resources management activities. These alternatives were selected to meet the intent of NEPA to cover the full spectrum of feasible alternatives. The suite of proposed goals and objectives could be combined in many fashions; however, cultural resources management is a more philosophical approach than a detailed list of specific actions. All alternatives originally considered have been retained within this document. No alternatives were dismissed from further consideration.

## 2.6 Comparison Summary of Alternatives

The cultural resources management techniques and activities discussed in this analysis are considered as a group of related actions. Most of the activities are directed specifically toward the location/survey and preservation of cultural/historic sites and each undertaking is associated with a variety of environmental actions. Integrated cultural resources management activities include compliance monitoring to ensure no adverse impacts from projects occur. All activities are integrated through the NEPA review process to ensure consistency with other plans and policies as well as other functional areas (e.g., to prevent disturbance of natural resources sites). The majority of the data collected is integrated into the Edwards AFB GIS, which serves as one of the primary integration tools.

Table 1 provides a comparison of the environmental impacts anticipated as a result of implementing all of the alternatives.

**TABLE 1**
**SUMMARY OF THE POTENTIAL ENVIRONMENTAL IMPACTS**

| ENVIRONMENTAL ISSUE | ALTERNATIVE A – TARGETED MANAGEMENT PLAN | ALTERNATIVE B – HIGH INTENSITY MANAGEMENT PLAN | ALTERNATIVE C – MINIMAL INTENSITY MANAGEMENT PLAN (NO ACTION) |
|---|---|---|---|
| **LAND USE** | | | |
| Compatibility with Base General Plan | Yes – Sensitive resource areas avoided, if possible. | Same as alternative A. | Same as alternative A. |
| Creation of Foreign Object Damage (FOD) | Debris (e.g., nuts, bolts, screws, wood, and trash) has the potential to end up on the runways during cultural resources management activities. | Slightly more than alternative A. | Slightly less than alternative A. |
| | Minimizations: Continued implementation of standard FOD practices and existing policies would reduce the potential for FOD impacts. | Minimizations: Same as alternative A. | Minimizations: Same as alternative A. |
| **AIR QUALITY** | | | |
| Air quality degradation | A short-term degradation of air quality may be experienced during project activities. | Slightly more than alternative A. | Slightly less than alternative A. |
| | Minimizations: Comply with all applicable Kern County Air Pollution Control District (KCAPCD), Mojave Desert Air Quality Management District (MDAQMD), and Antelope Valley Air Quality Management District (AVAQMD) rules and regulations. In addition, all federal, State, and local rules and regulations must be complied with. | Minimizations: Same as alternative A. | Minimizations: Same as alternative A. |
| Regionally significant | No. | No. | No. |
| Permits required | No. | No. | No. |

**TABLE 1 (Continued)**
**SUMMARY OF THE POTENTIAL ENVIRONMENTAL IMPACTS**

| ENVIRONMENTAL ISSUE | ALTERNATIVE A – TARGETED MANAGEMENT PLAN | ALTERNATIVE B – HIGH INTENSITY MANAGEMENT PLAN | ALTERNATIVE C – MINIMAL INTENSITY MANAGEMENT PLAN (NO ACTION) |
|---|---|---|---|
| **SAFETY AND OCCUPATIONAL HEALTH** | | | |
| Potential for exposure to hazardous noise levels | Hazardous noise levels would be encountered on the flightlines and Air Force Research Laboratory (AFRL) rocket test areas. | Slightly more than alternative A. | Slightly less than alternative A. |
| | Minimizations: All personnel present within hazardous noise areas shall follow the applicable Occupational Safety and Health Administration (OSHA) hearing protection guidelines. | Minimizations: Same as alternative A. | Minimizations: Same as alternative A |
| Potential for exposure to unexploded ordnance (UXO) | Unexploded ordnance would be encountered on the Precision Impact Range Area (PIRA) and Combat Arms Range (CAR). | Slightly more than alternative A. | Slightly less than alternative A. |
| | Minimizations: Project activities shall be coordinated with Downfall when occurring on the PIRA.<br><br>All field workers shall undergo EOD (Explosive Ordnance Disposal) awareness training prior to commencement of fieldwork.<br><br>If material suspected to be hazardous is found during project activities, the proponent/contractor shall notify Downfall and/or EOD. | Minimizations: Same as alternative A. | Minimizations: Same as alternative A. |

**TABLE 1 (Continued)**
**SUMMARY OF THE POTENTIAL ENVIRONMENTAL IMPACTS**

| ENVIRONMENTAL ISSUE | ALTERNATIVE A – TARGETED MANAGEMENT PLAN | ALTERNATIVE B – HIGH INTENSITY MANAGEMENT PLAN | ALTERNATIVE C – MINIMAL INTENSITY MANAGEMENT PLAN (NO ACTION) |
|---|---|---|---|
| **SAFETY AND OCCUPATIONAL HEALTH (Concluded)** | | | |
| Potential for exposure to lead | Lead would be encountered on and around the PIRA and CAR target areas.<br><br>Minimizations: Project personnel shall be aware of this potential and take necessary precautions. Follow Health and Safety Plan (HASP) procedures for metal contamination. | Slightly more than alternative A.<br><br>Minimizations: Same as alternative A. | Slightly less than alternative A.<br><br>Minimizations: Same as alternative A. |
| Potential for exposure to stress and disease as a result of desert condition | Typical stress and diseases include: heat stress, hypothermia, snake and spider bites, hantavirus, valley fever, and dehydration.<br><br>Minimizations: Compliance with all applicable OSHA, Air Force Occupational Safety and Health (AFOSH), and California OSHA (Cal-OSHA) rules and regulations would minimize exposure hazards to personnel. Follow HASP procedures for exposure conditions. | Slightly more than alternative A.<br><br>Minimizations: Same as alternative A. | Slightly less than alternative A.<br><br>Minimizations: Same as alternative A. |
| **BIOLOGICAL RESOURCES** | | | |
| Potential to harm an endangered/ threatened species | Cultural resources management activities have the potential to result in injury or loss of habitat.<br><br>Minimizations: Must follow the terms and conditions of the appropriate biological opinion, which includes desert tortoise awareness training. | Slightly more than alternative A.<br><br>Minimizations: Same as alternative A. | Slightly less than alternative A.<br><br>Minimizations: Same as alternative A. |

**TABLE 1 (Continued)**
**SUMMARY OF THE POTENTIAL ENVIRONMENTAL IMPACTS**

| ENVIRONMENTAL ISSUE | ALTERNATIVE A – TARGETED MANAGEMENT PLAN | ALTERNATIVE B – HIGH INTENSITY MANAGEMENT PLAN | ALTERNATIVE C – MINIMAL INTENSITY MANAGEMENT PLAN (NO ACTION) |
|---|---|---|---|
| **BIOLOGICAL RESOURCES (Concluded)** | | | |
| Compliance with the Migratory Bird Treaty Act | Cultural resources management activities have the potential to disturb nest sites.<br><br>Minimizations: Depredation permits for the contractor need to be obtained from the United States Fish and Wildlife Service. | Slightly more than alternative A.<br><br>Minimizations: Same as alternative A. | Slightly less than alternative A.<br><br>Minimizations: Same as alternative A |
| **CULTURAL RESOURCES** | | | |
| Presence of sites within the Area of Potential Effect (APE) | Yes. | Yes. | Yes. |
| Eligible or potentially eligible sites for listing on the National Register | Yes. | Yes. | Yes. |
| Ability to avoid sites | Yes.<br><br>Minimizations: Open excavation units shall be securely covered with weighted plywood covers at the end of each workday.<br><br>Only vegetation within, or immediately adjacent to, excavation units shall be removed.<br><br>Prior to the start of project activities, a record search of the project area shall be conducted to identify adjacent cultural resources sites, thus reducing the potential for impact to these sites. | Yes.<br><br>Minimizations: Same as alternative A. | Yes.<br><br>Minimizations: Same as alternative A. |

**TABLE 1 (Concluded)**
**SUMMARY OF THE POTENTIAL ENVIRONMENTAL IMPACTS**

| ENVIRONMENTAL ISSUE | ALTERNATIVE A – TARGETED MANAGEMENT PLAN | ALTERNATIVE B – HIGH INTENSITY MANAGEMENT PLAN | ALTERNATIVE C – MINIMAL INTENSITY MANAGEMENT PLAN (NO ACTION) |
|---|---|---|---|
| **CULTURAL RESOURCES (Concluded)**<br><br>Ability to avoid sites (Concluded) | Minimizations (Concluded): Excavation units shall be backfilled with the soil that was removed from the unit. If this is not sufficient to fill in the entire excavation unit, culturally sterile soil shall be added.<br><br>Debris shall not be left in and around cultural sites to protect the site's integrity. | | |
| **GEOLOGY AND SOILS**<br><br>Potential damage to Environmental Restoration Program (ERP) site remediation equipment | Cultural resources management activities may occur in the vicinity of ERP remediation equipment.<br><br>Minimizations: The proponent/contractor shall contact Environmental Management so the location of ERP equipment can be clearly identified. Damage to ERP equipment must be avoided. | Slightly more than alternative A.<br><br>Minimizations: Same as alternative A. | Slightly less than alternative A.<br><br>Minimizations: Same as alternative A. |
| **SOCIOECONOMIC**<br><br>Generation of revenue into the local economy | Cultural resources management activities would provide an incremental increase in revenues generated in the local economy.<br><br>Minimizations: None. | Slightly more than alternative A.<br><br>Minimizations: None. | Slightly less than alternative A.<br><br>Minimizations: None.. |

# 3.0 AFFECTED ENVIRONMENT

This section describes the relevant resources at Edwards AFB that may be impacted by any of the action alternatives if they were implemented. This section establishes the baseline against which the decision maker and the public can compare the effects of all action alternatives. The following environmental attributes comprise the existing environment: Land Use, Air Quality, Safety and Occupational Health, Hazardous Materials and Waste, Biological Resources, Cultural Resources, Geology and Soils, and Socioeconomics.

## 3.1 Land Use

Land may be used for a variety of purposes including residential, industrial, commercial, agricultural, recreational, and military. Specialized land uses may include radio transmission areas, bombing/missile ranges, wildlife enhancement areas, explosive ordnance ranges, and airfields. The *Edwards Air Force Base General Plan* (AFFTC 2001a) lays out long-range development at Edwards AFB. This Plan establishes the goals, policies, plans, and anticipated actions regarding the physical, social, and economic environment at Edwards AFB.

### 3.1.1 Regulatory Requirements/Guidance

*The Federal Land Policy and Management Act of 1976* (43 USC 1701 et seq.) establishes congressional policy relating to the use and management of public lands.

Air Force Instruction 32-7062*, Air Force* Comprehensive *Planning*, contains the responsibilities and requirements for comprehensive planning and describes the procedures for developing, implementing, and maintaining the General Plan.

Air Force Joint Manual (AFJMAN) 24-306*, Manual for Wheeled Vehicle Driver* and AFFTC Instruction (AFFTCI) 10-2*,* Control *of Vehicles on the Airfield,* contain procedures, policies, and responsibilities for use of vehicles within the airfield on Edwards AFB.

### 3.1.2 On-Base Land Use

Edwards AFB consists of approximately 301,000 acres in Kern, Los Angeles, and San Bernardino Counties. The base contains largely undeveloped or semi-improved land that is used to support the flight testing of a wide variety of military, civilian, and experimental aircraft and design and testing of rocket engines. The developed portion of the base includes approximately 6 percent of the total base area and is concentrated on the west side of Rogers Dry Lake. The developed areas of the base include Main Base, South Base, North Base, and the AFRL.

The *Edwards Air Force Base General Plan* (AFFTC 2001a) establishes land use designations for the base. Each category of land use is indicative of the predominate use of the facilities or land within that area and reflects the unique mission requirements and physical features, such as the dry lakebeds located on Edwards AFB. Within these various land use designations, specific areas have been set aside for a particular purpose. These include, but are not limited to the Off-Road Vehicle (ORV) Areas I and II, hunting and fishing areas, and ranges.

### 3.1.3 Airfield Operations

Airfield operations at the AFFTC are the responsibility of Airfield Management. Airfield Management operates the aircraft scheduling system and the base weather station that provides the meteorological support to the AFFTC for all flight test operations at Edwards AFB.

Use of the Edwards AFB airfield is limited to authorized personnel only, such as the AF, other government organizations, and contractors, to develop, test, and fly aircraft. Authorized government and private vehicles operate on the roads, taxiways, and runways. Pedestrian traffic occurs on the airfield, with the heaviest concentration being in and around the hangars. The period of greatest use on the airfield occurs during weekdays.

### 3.1.4 Foreign Object Damage Control

The term foreign object damage (FOD) refers to damage, particularly to aircraft, that occurs as a result of collision with, or ingestion of, objects on or around runways, taxiways, and other areas of aircraft operations. The prevention of FOD is targeted specifically near flightline areas and implementation procedures are contained in the AFFTC Supplement 1 to AFI 21-101*, Aerospace Equipment Maintenance Management*. The Quality Assurance Inspection Branch (412 TW/LGQ) manages the reduction and/or elimination of FOD.

## 3.2 Air Quality

Air quality in California is regulated by the United States Environmental Protection Agency (U.S. EPS), California Air Resources Board (CARB), and locally by Air Pollution Control Districts (APCDs) or Air Quality Management Districts (AQMD).

Stationary sources at Edwards AFB typically include fixed sources such as internal combustion engine (ICE) generators, external combustion boilers, and spray paint booths. Mobile sources typically include motor vehicles, construction equipment, and aircraft.

### 3.2.1 Regulatory Requirements/Guidance

The 1970 *Clean Air Act* (CAA) and the 1990 *Clean Air Act Amendments* (CAAA) (42 USC 7401–7671 and 42 USC 7661) are the body of federal laws that require the U.S. EPS and state to regulate air pollution emissions from stationary and mobile sources to protect public health and welfare. Air quality regulations were first promulgated with the CAA and revised with the CAAA.

The federal CAA requires the U.S. EPS to establish and maintain national ambient air quality standards (NAAQS) that are used to manage air quality across the country. Under the *California Clean Air Act* (CCAA), California Health and Safety Code, Division 26, the state of California has adopted ambient air quality standards, known as the California Ambient Air Quality Standards (CAAQS), which are published in the California Code of Regulations (CCR), title 17, section 70200. Generally, CAAQS are more stringent than NAAQS. Pollutants for which standards have been established are termed “criteria” pollutants because the standards are based on criteria that show a relationship between pollutant concentrations and effects on health and welfare. From this relationship, the U.S. EPS and the state establish acceptable pollutant concentration levels to serve as ambient air quality standards.

Title 40 CFR 61, *National Emission Standards for Hazardous Air Pollutants*, states that in addition to complying with the provisions of this part, the owner or operator of a stationary source subject to standards in this part may be required to obtain an operating permit issued to stationary sources by an authorized state air pollution control agency or by the administrator of the U.S. EPS pursuant to title V of the CAA as amended 15 November 1990 (42 USC 7661).

Under the CAAA of 1990, title V requires air agencies to establish federal operating permit programs and major sources of air pollutant to obtain title V operating permits. A title V permit is an all-encompassing permit that includes all local air district permits and regulatory requirements and documents compliance with other CAA regulations.

The federal CAA requires states with nonattainment areas to develop regulations and plans, known as State Implementation Plans (SIPs); describing the measures the state will take to achieve attainment with NAAQS. Within the state of California, the authority to regulate sources of air emissions resides with the CARB and is delegated to local APCDs and AQMDs. Local districts prepare SIP elements for the areas under their regulatory jurisdiction and submit these elements to the CARB for review and approval. The CARB then incorporates the individual air district elements into a statewide SIP. The plan is then submitted to the U.S. EPS for approval and publication in the Federal Register. The local districts then enact rules and regulations to achieve their SIP requirements.

### 3.2.2 National Ambient Air Quality Standards

The CAA and CAAA established the NAAQS for the regulation of criteria pollutants. Criteria pollutants are chemical compounds that are known to have serious public health impacts, as well as cause damage to the environment in general. Within the state of California, the authority to regulate sources of air emissions resides with the CARB and is delegated to local air pollution control and air quality management districts. The criteria pollutants include ozone ($O_3$), carbon monoxide (CO), nitrogen oxides ($NO_x$), sulfur oxides ($SO_x$), and particulate matter equal to or less than 10 microns (PM10).

The U.S. EPS designates all areas of the United States as having air quality better than (attainment) or worse than (nonattainment) the NAAQS. An area is often designated as unclassified when there are insufficient ambient criteria pollutant data for the U.S. EPS to form a basis for attainment status. Once an area is classified as nonattainment, the degree of nonattainment is divided into categories of *marginal*, *moderate*, *serious*, *severe*, or *extreme*. The assignment of a nonattainment category is based on measured criteria pollutant concentrations in a given location and varies according to the criteria pollutant of concern.

States are required to develop a SIP that implements, maintains, and enforces the measures needed to attain and maintain the NAAQS within each state. The California $O_3$ SIP was approved by the U.S. EPS in September 1996 and codified as law in 40 CFR 52, subpart F, *Approval and Promulgation of Implementation Plans – California*.

### 3.2.3 Environmental Setting

The AQMD and APCD boundaries are based on meteorological and geographic conditions and, where possible, jurisdictional boundaries such as county lines. Edwards AFB lies within the

Mojave Desert Air Basin (MDAB). As shown in figure 2, Edwards AFB is located within the jurisdiction of three local air districts: Kern County Air Pollution Control District (KCAPCD), Mojave Desert Air Quality Management District (MDAQMD), and Antelope Valley Air Quality Management District (AVAQMD).

Project activities could occur in any of the three local air districts. Most anticipated air emissions will be from mobile sources.

#### 3.2.3.1 Climate

The Mojave Desert is sheltered from maritime weather influences of the Pacific Ocean by the Coastal Range to the west and the San Gabriel Mountains to the south. The MDAB has an arid continental desert climate.

The climate of the Mojave Desert is governed by the strength and location of a semipermanent, subtropical, high-pressure cell over the Pacific Ocean. In general, hot summers, cold winters, infrequent rainfall, active air movement, and very low relative humidity characterize the climate of most of the region.

Thunderstorm activity in the region is rare. Relative humidity at the base is very low in the summer (30 to 50 percent in the early morning; 10 to 20 percent in the late afternoon). These conditions promote intensive heat during the day in the summer and marked cooling at night. The intense solar radiation in the summer is highly conducive to the formation of ozone and other photochemical oxidants in the atmosphere, but only when precursor chemicals are present.

#### 3.2.3.2 Wind/Pollutant Dispersion

The prevailing wind direction is from the west-southwest (240 degrees) throughout the year with an average windspeed of 8 miles per hour (mph). The highest average windspeeds occur during the spring and summer, with the lowest windspeeds occurring during the winter. Calm occurs about 19.3 percent of the time on an annual basis. Atmospheric stability, the measure of vertical dispersion of pollutants, is high at Edwards AFB. Stable conditions, which are an indication of weak pollutant dispersion, exist about 57 percent of the time; thus indicating that the potential for collection of pollution in the area is relatively high.

Area mountain and valley patterns cause a wide fluctuation in the levels of rainfall and temperatures influence basin windflow that in turn affect dispersion along mountain ridges, vertical mixing, and photochemistry of pollutants.

The Tehachapi Pass in the Tehachapi Mountains and the pass through Saugus on Highway 14 serve as conduits allowing air movement from the San Joaquin Valley and the Los Angeles areas into the western portion of the MDAB. This air movement allows pollutant transport from the San Joaquin Valley and the Los Angeles basin to influence the air quality of the MDAB. Air pollution also enters the Antelope Valley from the San Bernardino area through the Cajon Pass (AFFTC 1995a).

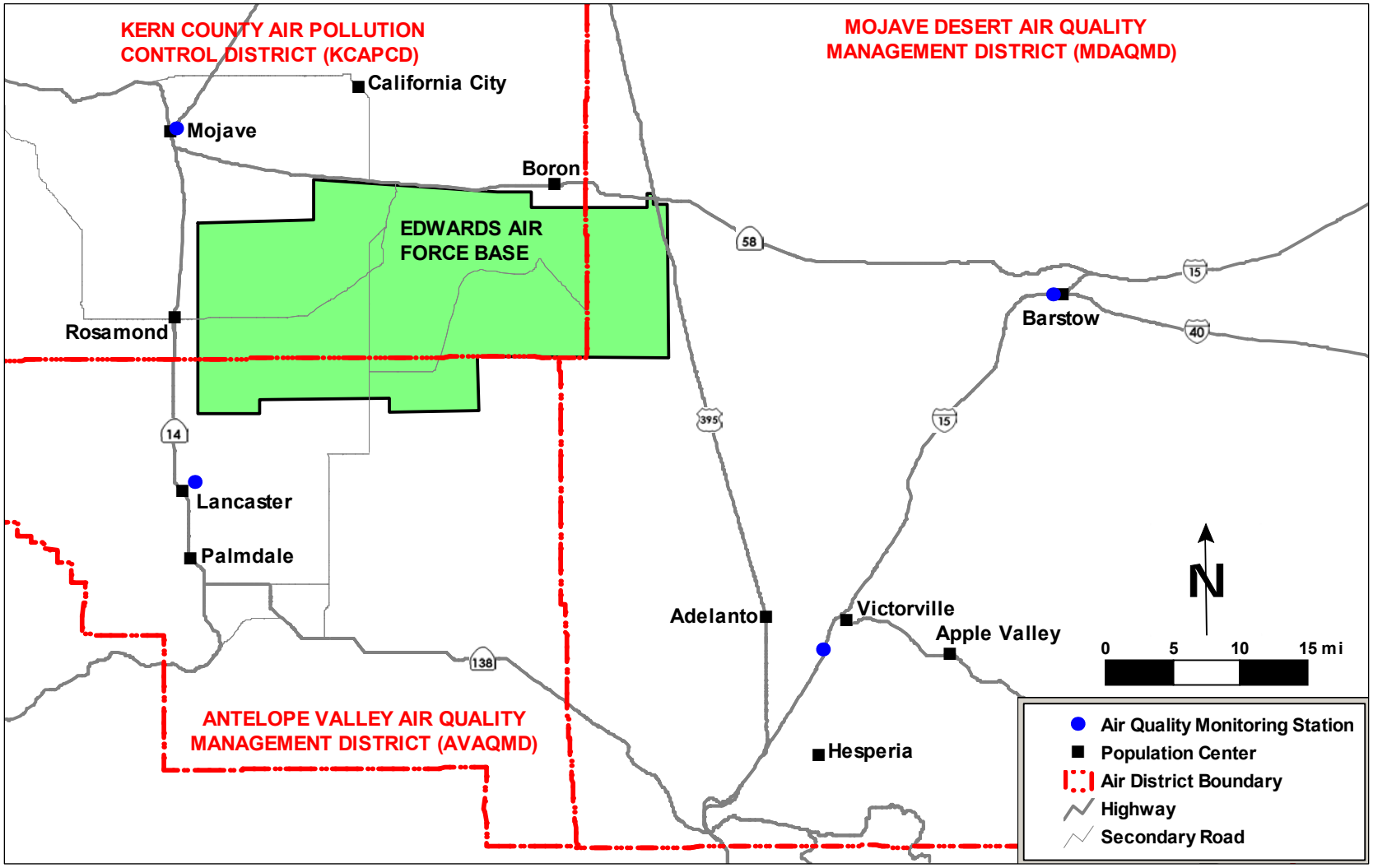



**Figure 2 Air District Map**

#### 3.2.3.3 Baseline Air Quality

Air quality in a given location is described by the concentration of various pollutants in the atmosphere, generally expressed in units of parts per million (ppm) or micrograms per cubic centimeter. Air quality is determined by the type and amount of pollutants emitted into the atmosphere, size and topography of the air basin, and prevailing meteorological conditions. The significance of the pollutant concentration is determined by comparing it to the NAAQS and CAAQS. These standards represent the maximum allowable atmospheric concentrations that may occur while ensuring protection of public health and welfare, with a reasonable margin of safety.

The U.S. EPA has developed numerical concentration-based NAAQS for seven criteria pollutants under the provisions of the CAA. The NAAQS have been established for $O_3$, PM10, fine particulate matter equal to or less than 2.5 microns (PM2.5), CO, nitrogen dioxide ($NO_2$), sulfur dioxide ($SO_2$), and lead (Pb).

The CARB has developed numerical concentration-based CAAQS for the same seven criteria pollutants plus visibility reducing particles, sulfates, hydrogen sulfide, and vinyl chloride. The criteria pollutants and state and federal standards are listed in table 2.

The CARB and U.S. EPS track air quality on an ongoing basis and designate areas or basins as either attainment or nonattainment, on a pollutant-specific basis, IAW either CAAQS or NAAQS. As indicated previously, for some pollutants, an area can be designated as a *basic*, *moderate*, *serious*, *severe*, or *extreme* nonattainment area depending upon the level of pollutant concentrations. Likewise, if standards for pollutants are met in a particular area, the area is designated as attainment. Where standards may not have been established, or monitoring data does not exist for certain criteria pollutants, these areas are considered unclassified. Unclassified denotes a lack of data or other information sufficient to make a designation. Unclassified areas are treated as attainment areas until proven otherwise.

Air quality in a given location is described by the concentration of various pollutants in the atmosphere. The type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing weather conditions determine air quality. The significance of the pollutant concentration is determined by comparing it to the federal and state ambient air quality standards. These standards represent the maximum allowable atmospheric concentrations that may occur while ensuring protection of public health and welfare, with a reasonable margin of safety.

Table 3 presents the attainment status of eastern Kern County for criteria pollutants. The attainment status of the neighboring air basins or air districts is very similar to that of eastern Kern County, with the following exceptions:

a. The Southeast Desert Air Quality Management Area (portions of AVAQMD in Los Angeles County and portions of MDAQMD in San Bernardino County) is designed as *severe* nonattainment for the 1-hour ozone NAAQS and *moderate* nonattainment for the 8-hour ozone NAAQS.

b. The MDAQMD is also designated *moderate* nonattainment for the NAAQS for PM10.

**TABLE 2**
**FEDERAL AND CALIFORNIA AMBIENT AIR QUALITY STANDARDS**

| Pollutant | Averaging Time | California Standards[1] | | Federal Standards[2] | | |
|---|---|---|---|---|---|---|
| | | Concentration[3] | Method[4] | Primary[3,5] | Secondary[3,6] | Method[7] |
| **Ozone ($O_3$)** | 1 Hour | 0.09 ppm (180 μg/m$^3$) | Ultraviolet Photometry | 0.12 ppm (235 μg/m$^3$)[8] | Same as Primary Standard | Same as Primary Standard |
| | 8 Hour | N/A | | 0.08 ppm (157 μg/m$^3$)[8] | | |
| **Respirable Particulate Matter (PM10)** | 24 Hour | 50 μg/m$^3$ | Gravimetric or Beta Attenuation | 50 μg/m$^3$ | Same as Primary Standard | Inertial Separation and Gravimetric Analysis |
| | Annual Arithmetic Mean | 20 μg/m$^3$* | | 150 μg/m$^3$ | | |
| **Fine Particulate Matter (PM2.5)** | 24 Hour | No Separate State Standard | | 65 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 ppm (10 mg/m$^3$) | Nondispersive Infrared Photometry (NDIR) | 9 ppm (10 mg/m$^3$) | None | NDIR |
| | 1 Hour | 20 ppm (23 mg/m$^3$) | | 35 ppm (40 mg/m$^3$) | | |
| | 8 Hour (Lake Tahoe) | 6 ppm (7 mg/m$^3$) | | N/A | | N/A |
| **Nitrogen Dioxide ($NO_2$)** | Annual Arithmetic Mean | N/A | Gas Phase Chemiluminescence | 0.053 ppm (100 μg/m$^3$) | Same as Primary Standard | Gas Phase Chemiluminescence |
| | 1 Hour | 0.25 ppm (470 μg/m$^3$) | | N/A | | |
| **Sulfur Dioxide ($SO_2$)** | Annual Arithmetic Mean | N/A | Ultraviolet Fluorescence | 0.03 ppm (80 μg/m$^3$) | N/A | Spectrophotometry (Pararosaniline Method) |
| | 24 Hour | 0.04 ppm (105 μg/m$^3$) | | 0.14 ppm (365 μg/m$^3$) | N/A | |
| | 3 Hour | N/A | | N/A | 0.5 ppm (1300 μg/m$^3$) | |
| | 1 Hour | 2.25 ppm (655 μg/m$^3$) | | N/A | N/A | N/A |
| **Lead (Pb)**[9] | 30-Day Average | 1.5 μg/m$^3$ | Atomic Absorption | N/A | N/A | N/A |
| | Calendar Quarter | N/A | | 1.5 μg/m$^3$ | Same as Primary Standard | High Volume Sampler and Atomic Absorption |
| **Visibility Reducing Particles** | 8 Hour | Extinction coefficient of 0.23 per kilometer-visibility of 10 miles or more (0.07 per kilometer-visibility, 30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 per percent. Method: Beta Attenuation and Transmittance through Filter Tape. | | No federal standards | | |
| **Sulfates** | 24 Hour | 25 μg/m$^3$ | Ion Chromatography | | | |

**TABLE 2 (Concluded)**
**FEDERAL AND CALIFORNIA AMBIENT AIR QUALITY STANDARDS**

| Pollutant | Averaging Time | California Standards[1] | | Federal Standards[2] | | |
|---|---|---|---|---|---|---|
| | | Concentration[3] | Method[4] | Primary[3,5] | Secondary[3,6] | Method[7] |
| **Hydrogen Sulfide** | 1 Hour | 0.03 ppm (42 μg/m$^3$) | Ultraviolet Fluorescence | No federal standards | | |
| **Vinyl Chloride[9]** | 24 Hour | 0.01 ppm (26 μg/m$^3$) | Gas Chromatography | | | |

Notes: 1. μg/m$^3$ – 1 x 10$^{-6}$ grams per cubic meter
2. N/A – Not Applicable
3. ppm – parts per million
4. mg/m$^3$ – milligrams/per cubic meter

*On 20 June 2002, the Air Resources Board (ARB) approved staff's recommendation to revise the PM10 annual average standard to 20 μg/m$^3$ and to establish an annual average standard for PM2.5 of 12 μg/m$^3$. These standards will take affect upon final approval by the Office of Administrative Law, which is expected in May 2003. Information regarding these revisions can be found at http://www.arb.ca.gov/research/aaqs/std-rs/std-rs.htm.

[1]California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, suspended particulate matter – PM10, PM2.5, 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 title 17 California Code of Regulations Section 70200.

[2]Federal 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 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM10, the 24-hour standard is attained when 99 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. For PM2.5, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current federal policies.

[3]Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25 degrees Centigrade and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25 degrees Centigrade and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[4]Any equivalent procedure that can be shown to the satisfaction of the Air Resources Board (ARB) to give equivalent results at or near the level of the air quality standard may be used.

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

[6]National Secondary Standards: The levels of air quality necessary to protect the public welfare from any know or anticipated adverse effects of a pollutant.

[7]Reference method is as described by the U.S. EPS. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the U.S. EPS.

[8]U.S. EPS promulgated new federal 8-hour ozone and fine particulate matter standards on 18 July 1997. Contact the U.S. EPA for further clarification and current federal policies.

[9]The ARB has identified lead and vinyl chloride as "toxic air contaminants" with no threshold 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.

[10]Source: California Air Resources Board, 09 Jul 03.

**TABLE 3[1]**
**ATTAINMENT STATUS OF EASTERN KERN COUNTY**

| Pollutant | Federal Status | State Status |
|---|---|---|
| Ozone ($O_3$) – 1-hour | Attainment/Maintenance | *Moderate* Nonattainment |
| Ozone ($O_3$) – 8-hour | *Basic* Nonattainment | Not Applicable |
| Respirable Particulate Matter (PM10) | Unclassified | Nonattainment |
| Fine Particulate Matter (PM2.5) | Unclassified[2] | Unclassified[2] |
| Carbon Monoxide (CO) | Unclassified/Attainment | Unclassified |
| Nitrogen Dioxide ($NO_2$) | Unclassified/Attainment[3] | Attainment[4] |
| Sulfur Dioxide ($SO_2$) | Unclassified/Attainment[3] | Unclassified[4] |
| Lead[4] | Attainment | Attainment[4] |
| Visibility Reducing Particles | No Federal Standard | Unclassified[4] |
| Sulfates | No Federal Standard | Attainment |
| Hydrogen Sulfide | No Federal Standard | Unclassified |
| Vinyl Chloride[5] | No Federal Standard | Unclassified |

[1]Source: California Air Resources Board, 9 Jun 03
[2]PM2.5 is currently not classified; U.S. EPS is due to make final designation for PM2.5 by December 2004.
[3]All areas in the state are either attainment or unclassified for nitrogen dioxide and sulfur dioxide.
[4]All areas in the state are either attainment or unclassified for nitrogen dioxide, sulfur dioxide, lead, and visibility reducing particles.
[5]The California Air Resources Board (CARB) has identified lead and vinyl chloride as "toxic air contaminants" with no threshold 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.

c. The MDAQMD is also designated *moderate* nonattainment for the state ozone standard, but the portion of the AVAQMD in Los Angeles County is designated *extreme* nonattainment for the ozone CAAQS based on historical South Coast Air Basin designation (AVAQMD 2002).

#### 3.2.3.3.1 Ozone

Ozone is what is referred to as a secondary pollutant, a pollutant formed in the atmosphere by photochemical reactions involving previously emitted pollutants or precursors. Ozone precursors are mainly two types, VOCs and $NO_X$. Volatile organic compounds are organic compounds that contain carbon and hydrogen. The U.S. EPA defines a VOC as any organic compound that participates in atmospheric photochemical reactions. Nitrogen oxide is the designation given to the group of all oxygenated nitrogen species, including nitric oxide, nitrogen dioxide, nitric anhydride, and nitrous anhydride. Since VOCs and $NO_X$ participate in atmospheric photochemical reactions that produce ozone, the attempt is made to control ozone through the control of VOCs and $NO_X$. Therefore, the pollutants of concern are VOCs and $NO_X$.

Identifying the region of influence for air quality assessment requires knowledge of the pollutant types, source emission rates and release parameters, and local and regional meteorological conditions. For inert pollutants (all pollutants other than ozone, its precursors, and $NO_2$), the region of influence is generally limited to an area within a few miles downwind from the source. The region of influence for ozone may extend much farther downwind than that for other

pollutants. In the presence of solar radiation, the maximum effect of precursor emissions on ozone levels usually occurs several hours after they are emitted and many miles from the source.

Ozone and its precursors transported from other regions can also combine with local emissions to produce high local ozone concentrations. Ozone concentrations are generally the highest during the summer months and coincide with periods of maximum solar radiation. The maximum effect of precursor emissions on ozone levels usually occurs several hours after they are emitted and many miles from the source. Maximum ozone concentrations tend to be regionally distributed because precursor emissions are homogeneously dispersed in the atmosphere (AFFTC 1995a). Ozone may pose a health threat to those who already suffer from respiratory diseases as well as healthy people.

Until very recently, air quality in eastern Kern County was designated *serious* nonattainment for the federal 1-hour ozone standard. On 22 April 2004, the U.S. EPA issued a direct final rule to designate eastern Kern County areas as attainment for the 1-hour ozone NAAQS and also approved their maintenance plan. On 15 April 2004, the U.S. EPA designated eastern Kern County as *basic* nonattainment for the 8-hour ozone NAAQS.

Under state regulations, the eastern Kern County area is designated *moderate* nonattainment for ozone. The area is attainment for PM10 under federal regulations, but is nonattainment under state standards.

#### 3.2.3.3.2 Particulate Matter

Particulate matter consists of very small liquid and solid particles in the air. Particulate matter less than 10 microns in diameter are referred to as PM10. Sources of PM10 include motor vehicles; wood-burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires and brush/waste burning; industrial sources; and windblown dust from open lands. Particulate matter also forms when gases are emitted from motor vehicles and also causes reduced visibility. Health effects include increased respiratory disease, lung damage, and cancer, thus resulting in premature death.

The measurement of existing ambient criteria pollutant concentrations is accomplished using air quality monitoring stations. The closest CARB air quality monitoring station to Edwards AFB is located in Mojave, California. Table 4 shows the 2000 through 2002 data received at the monitoring station for criteria pollutants as they relate to NAAQS and CAAQS and the number of times the criteria pollutants measured at the Mojave Air Station equaled or exceeded the standards for a given year. For the purpose of this EA, these data are provided as information only. This data is only provided to illustrate the current ambient air quality in the Edwards AFB area.

### 3.2.4 Local District Control

The NAAQS nonattainment status of the air districts with jurisdiction over Edwards AFB is presented in figure 3. As indicated previously, the KCAPCD is designated as being attainment/ maintenance for the 1-hour ozone NAAQS, *basic* nonattainment for the 8-hour ozone NAAQS,

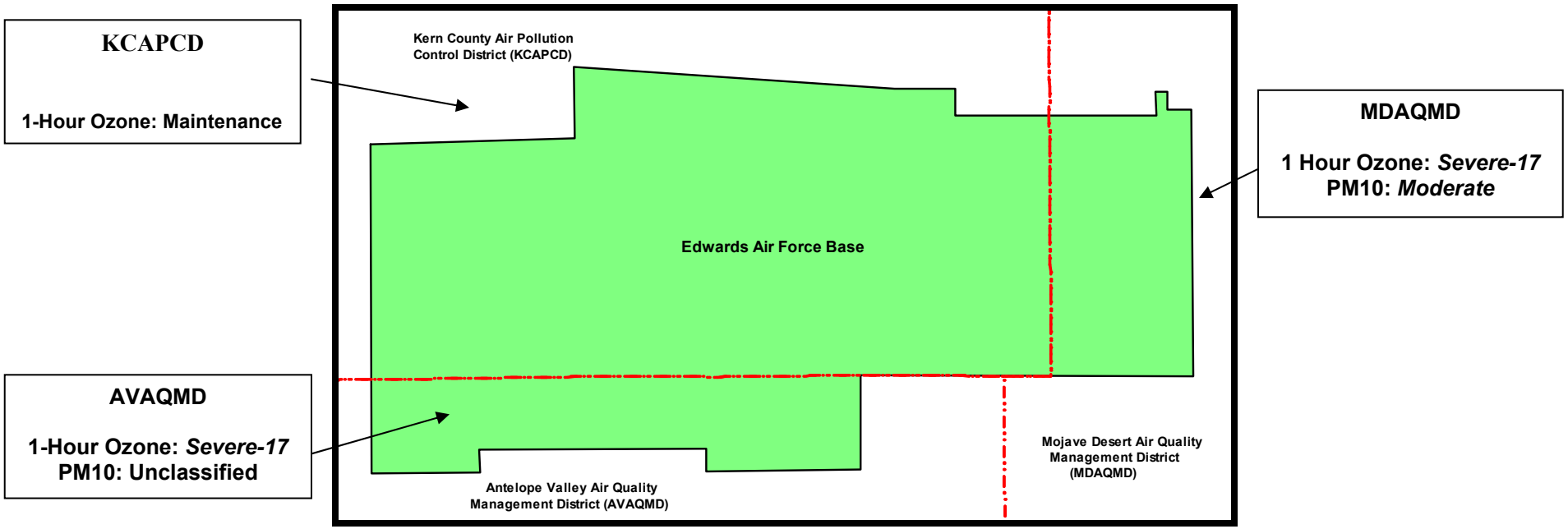
**TABLE 4**
**NUMBER OF DAYS MOJAVE AIR STATION WAS ABOVE THE HOURLY STANDARD FOR CRITERIA POLLUTANTS**

| CRITERIA POLLUTANT | DAYS EQUAL TO/OR EXCEEDING AIR QUALITY STANDARDS | |
|---|---|---|
| | NAAQS | CAAQS |
| Ozone ($O_3$) | 0 (2000)<br>1 (2001)<br>0 (2002) | 25 (2000)<br>33 (2001)<br>18 (2002) |
| Respirable Particulate Matter (PM10) | 0 (2000)<br>0 (2001)<br>1 (2002) | 0 (2000)<br>0 (2001)<br>0 (2002) |
| Fine Particulate Matter (PM2.5) | 0 (2000)<br>0 (2001)<br>0 (2002) | 0 (2000)<br>0 (2001)<br>0 (2002) |
| Nitrogen Dioxides | | 0 (2000)<br>0 (2001)<br>0 (2002) |

Notes: 1. NAAQS - National Ambient Air Quality Standard
2. CAAQS - California Ambient Air Quality Standard

Source: California Air Resources Board, 15 May 03.

# EDWARDS AFB
# Current NAAQS Attainment Status




**LEGEND**

***Severe-17*** = 25-ton limit per pollutant per action per year
**Maintenance** = 100-ton limit per pollutant per action per year

***Moderate*** = 100 ton-limit per pollutant per action per year
**Unclassified** = no established limit

SOURCE: 40 Code of Federal Regulations 81.305

**Figure 3 Attainment Status Map**

and in attainment or unclassified for all other pollutants.[1] The MDAQMD is designated as being *severe* $O_3$ nonattainment, *moderate* PM10 nonattainment, and in attainment or unclassified for all other pollutants. The AVAQMD is designated *severe* $O_3$ nonattainment and in attainment or unclassified for all other pollutants.

To ensure compliance with relevant federal and state air laws, each district enacts their own rules and regulations. Local air districts use stationary source new source review (NSR) permits, such as an Authority to Construct (ATC) and a Permit to Operate (PTO) as one means of implementing air quality rules and regulations. In addition, districts like the KCAPCD may develop guidelines for environmental review of proposed projects under the *California Environmental Quality Act* (CEQA).

For KCAPCD, NSR is implemented under KCAPCD Rule 210.1, *New and Modified Stationary Source Review (NSR)*. These rules and regulations provide for the preconstruction review of new and modified stationary sources of affected air pollutants to ensure emissions would not interfere with the attainment of ambient air quality standards; ensure appropriate new and modified sources of affected pollutants are constructed with the Best Available Control Technology (BACT); and provide for no net increase in emissions from new and modified stationary sources for all nonattainment pollutants and their precursors.

In order to enforce these rules, the air districts have established baseline emission levels for new or modified stationary sources of PM10, $SO_X$, $NO_X$, and VOCs in nonattainment areas (table 5). Projects that generate emissions in excess of these threshold levels would require offsets.

**TABLE 5**
**NEW SOURCE REVIEW THRESHOLD EMISSION LEVELS**

| | **New Source Review Threshold Emission Levels per Pollutant (tons/year)** | | | |
|---|---|---|---|---|
| **Air District** | **PM10** | **$SO_x$** | **VOC** | **$NO_x$** |
| KCAPCD | 15 | 27 | 25 | 25 |
| AVAQMD | 15 | 25 | 25 | 25 |
| MDAQMD | 4 | 4 | 4 | 4 |

Notes:
1. PM10 – particulate matter less than or equal to 10 microns
2. $SO_X$ – sulfur oxides
3. VOC – volatile organic compounds
4. $NO_X$ – oxides of nitrogen
5. KCAPCD – Kern County Air Pollution Control District
6. AVAQMD - Antelope Valley Air Quality Management District
7. MDAQMD – Mojave Desert Air Quality Management District

Source: KCAPCD Rules and Regulations 2004 – http://www.arb.ca.gov/DRDB/KER/CURHTML/R210-1.HTM.

In this case, the proposed project is not a stationary source subject to KCAPCD, AVAQMD, or MDAQMD NSR permitting requirements. Rather, it is primarily a project that uses vehicles as the

[1]The KCAPCD has jurisdiction over the eastern half of Kern County, which was recently redesignated as attainment/maintenance for the 1-hour ozone NAAQS. The AVAQMD has jurisdiction over northern Los Angeles County and is classified with regard to attainment status separately from the rest of Los Angeles County. The MDAQMD is also designated *moderate* nonattainment for the NAAQS for PM10.

primary mobile source. The proposed project would not require air permits, with the exception of a permit for any stationary sources required by the construction contractor.

The proposed project is not subject to the CEQA, as stated in the KCAPCD CEQA guidelines, "Federal government actions that do not require a district permit are not subject to CEQA" (KCAPCD 1999).

To ensure compliance with all relevant federal and state air laws, each district enacts their own rules and regulations. Local air districts use permits such as the ATC and PTO as a method of implementing these rules and regulations.

Under the CAAA of 1990, title V requires that major sources of air pollutants within each air district obtain a federal operating permit. This permit is an all-encompassing permit, which includes all local air district permits (i.e., criteria pollutants and hazardous air pollutants [HAPs]) and documents compliance with other CAA regulations. Edwards AFB has received its title V permits from KCAPCD and is waiting for title V permits from MDAQMD and AVAQMD.

#### 3.2.4.1 Toxic Air Contaminants and Hazardous Air Pollutants

In addition to the criteria pollutants, concern about noncriteria pollutants or toxic air contaminants (TACs) and HAPs has increased in recent years. The TACs include airborne inorganic and organic compounds that can have both short-term (acute) and long-term (carcinogenic, chronic, and mutagenic) effects on human health. At the federal level, potentially toxic pollutants are called HAPs. The HAPs are defined as air pollutants that may cause serious human health effects, including mortality.

At Edwards AFB, TACs or HAPs are generated as a result of various processes, including aircraft cleaning and painting, lubricating processes, fuel combustion (e.g., tactical support equipment [TSE], boilers, turbine engines), and adhesive/sealant applications.

The U.S. EPS and California agencies have written regulations to evaluate, and if necessary, mitigate TAC emission sources. Prior to the 1990 CAAA, the U.S. EPS conducted a program to establish National Emission Standards for Hazardous Air Pollutants (NESHAPs). The NESHAPs were established for benzene, vinyl chloride, radionuclides, mercury, asbestos, beryllium, inorganic arsenic, radon 222, and coke oven emissions. The 1990 CAAA lists 189 total pollutants that are defined as HAPs and requires the U.S. EPS to set standards for categories and subcategories of sources that emit HAPs rather than for the pollutants themselves. The U.S. EPS began issuing the new standards in November 1994. The NESHAPs set prior to 1991 remain applicable.

The applicability of a NESHAP to a facility operation is determined by the potential to emit (PTE) HAPs from all applicable sources. The HAP PTE threshold values are 10 tons per year for a single HAP and 25 tons per year for any two or more HAPs.

Based on its PTE, Edwards AFB is defined as a major source of HAPs and must comply with any applicable NESHAP. One NESHAP that applies to Edwards AFB is the Aerospace NESHAP

(40 CFR 63, subpart GG). This NESHAP controls HAP emissions resulting from aerospace manufacturing and rework facilities.[2]

In California, Assembly Bill (AB) 1807, the *Tanner Act*, established the State Air Toxics Program for identifying and developing emissions control and reduction methods for TACs. The bill formally designated 18 substances as TACs. In 1993, the 189 HAPs identified by the U.S. EPS were incorporated into California law as TACs. Other pollutants have been added more recently, such as particulate emissions from diesel-fueled engines, designated by California as a carcinogen.

The California Air Toxic Hot Spots Program was created by the *Air Toxics "Hot Spots" Information and Assessment Act of 1987* (AB 2588 and California State Health and Safety Code sections 44300 through 44384). The act regulates more than 700 air toxics, including all designated TACs. Under AB 2588, industrial and municipal facilities emitting more than 10 tons per year of any criteria air pollutant must estimate and report their TAC emissions to local air districts. The local air districts then prioritize facilities as high, medium, or low priority. This designation is used to determine the specific requirements needed to comply with AB 2588. High-priority facilities are required to submit a human health risk assessment. If the predicted health risks are great enough, the facility must communicate the results to the public and implement a risk reduction program. Medium- and low-priority facilities are merely required to pay fees and provide updates to their emission inventories every 4 years or sooner if major changes affecting TACs are undertaken.

In 1994, based on the basewide TAC emission inventory, the KCAPCD rated Edwards AFB as a medium-priority facility. No further action has been required other than a periodic inventory update.

#### 3.2.4.2 California State Implementation Plan

The California $O_3$ SIP was approved by the U.S. EPS in September 1996 and codified into law in 40 CFR 52, subpart F.[3] For MDAQMD and AVAQMD, the regional planning emission inventories for each district for $O_3$ precursor pollutant ($NO_x$ and VOC) emissions are included in the 1994 California $O_3$ SIP. In the California $O_3$ SIP, the regional planning baseline year is 1990 for each of these districts. For MDAQMD, the regional planning emission inventory for PM10 pollutant emissions are from the 1990-baseline year. Other than this SIP and the documents described in the following, no other SIPs or air quality management plans apply to the proposed project site.

Cultural resources management activities could occur basewide, in any of the three air districts. Until recently, the U.S. EPS had designated the KCAPCD as being *serious* nonattainment for the 1-hour ozone NAAQS. The applicable ozone SIP for eastern Kern County consisted of the *Attainment Demonstration and the Reasonable Further Progress Plan (Post-1996 Rate of Progress Plan) Volumes I and II* (KCAPCD 1994). These documents were based on a 1999 attainment date.

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[2] Typical processes and operations at Edwards AFB include hand-wipe cleaning, spray-gun cleaning, primer and topcoat application, paint stripping, waste storage and handling, and chemical milling maskant.
[3] This SIP also includes the AVAQMD 1994 Air Quality Management Plan (AVAQMD 1994).

Based on ambient monitoring data from 1999 to 2003, the KCAPCD staff have determined that the area has attained the 1-hour ozone standard and prepared an *Ozone Attainment Demonstration, Maintenance Plan, and Redesignation Request (Maintenance Plan)* (KCAPCD 1993). Approval of this request by the U.S. EPS would result in a revised $O_3$ SIP.

On 22 April 2004, the U.S. EPS published a Direct Final Rule in the federal register regarding *Approval and Promulgation of Implementation Plans, Finding of Attainment, and Designation of Areas for Air Quality Planning Purposes; 1-Hour Ozone Standard, East Kern County, California* (Federal Register, Volume 69, Number 78, Pages 21731–21737). In this rule, the U.S. EPS announced redesignation of the eastern Kern County area as attainment for the 1-hour ozone NAAQS, approving the eastern Kern County 1-hour ozone maintenance plan and motor vehicles emissions budgets as revisions to the eastern Kern County portion of the California $O_3$ SIP. This final rule became effective on 21 June 2004 (Jesson 2004).

On 15 April 2004, the U.S. EPS designated eastern Kern County as *basic* nonattainment for the 8-hour ozone NAAQS (40 CFR 81). The KCAPCD will be required to prepare a *basic* attainment plan for EPA approval by June 2007.

### 3.2.5 Conformity Requirements

Under the conformity provisions of the federal CAAA, no federal agency can approve or undertake a federal action, or project, unless the project has been demonstrated to conform to the applicable SIP. These conformity provisions were put in place to ensure that federal agencies contribute to efforts to attain the NAAQS. The U.S. EPS has issued two conformity guidelines: transportation conformity rules that apply to transportation plans and projects and general conformity rules that apply to all other federal actions. A conformity determination[4] is only required for the alternative that is ultimately selected and approved. The general conformity determination is submitted in the form of a written finding, issued after a minimum 30-day public comment period on the draft determination.

Applicable only in areas designated as nonattainment or maintenance for NAAQS, the general conformity rule prohibits any federal action that does not conform to the applicable air quality attainment plan or SIP. General conformity applicability analysis requires quantification of construction and operation emissions for the project and comparison of these emission levels to baseline emission levels. If the differences in emissions (i.e., the net emission associated with the proposed project) exceed the general conformity *de minimis* levels for the peak year or any milestone year for attainment of standards, additional general conformity determination is required.

A project is exempt from the conformity rule (presumed to conform) if the total net project-related emissions (construction and operation) pass two tests: they are less than the *de minimis* thresholds established by the conformity rule and they are not regionally significant. Emissions are regionally significant if they exceed 10 percent of the total threshold emission inventory. A project that produces emissions that exceed conformity thresholds, or is regionally significant, is required to demonstrate conformity with the SIP through minimization or other accepted practices.

[4]A conformity determination is a process that demonstrates how an action would conform to the applicable implementation plan. If the emissions cannot be reduced sufficiently, and if air dispersion modeling cannot demonstrate conformity, then either a plan for mitigating or a plan for offsetting the emissions would need to be pursued.

The proposed project is located throughout Edwards AFB. Thus, the NAAQS nonattainment and regional planning emission inventories for KCAPCD, MDAQMD, and AVAQMD would be used to determine the applicability of air conformity requirements to the proposed action.

For project activities located within the Kern County portion of Edwards AFB. The area attains or is unclassified for all NAAQS, except for the 1- and 8-hour ozone NAAQS (for which the area is classified attainment/maintenance and *basic* nonattainment, respectively). In this area, the ozone precursor emissions, $NO_x$ and VOC, are subject to general conformity requirements. In accordance with the air conformity requirements of 40 CFR 51.853/93.153(b)(1) and KCAPCD Rule 210.7, the *de minimis* levels set for the $O_3$ attainment/maintenance areas is up to 100 tons per $O_3$ precursor pollutant ($NO_X$ and VOC) per year per federal action. The same *de minimis* level has been assumed for the *basic* nonattainment area.[5]

As a result, this air quality analysis refers almost exclusively to regulatory requirements and air quality impacts in KCAPCD. However, there is some potential for project-related construction delivery and haul vehicles to travel and generate air emissions in northern Los Angeles County, in the AVAQMD portion of the base. Because this emissions increase would occur in an area that is nonattainment for the ozone NAAQS, and because the emissions increase associated with this motor vehicle travel would indirectly result from the proposed project, this potential emissions increase has also been considered in the analysis of the applicability of general conformity to the proposed project. The applicable *de minimis* level for $O_3$ *severe* nonattainment areas, such as AVAQMD, is up to 25 tons per $O_3$ precursor pollutant ($NO_x$ and VOC) per year per federal action.

In addition to *de minimis* levels, the NAAQS regional planning emission inventories for KCAPCD and AVAQMD would be used to determine the applicability of air conformity requirements to the proposed action. For KCAPCD and AVAQMD, the regional planning emission inventories for $O_3$ precursor pollutants ($NO_x$ and VOC) are included in the 1994 California $O_3$ SIP (CARB 1994). In the California $O_3$ SIP, the regional planning baseline year is 1990. See table 5 for the 1990 regional baseline emission inventory and the 10-percent threshold values.

Federal facilities located in a NAAQS nonattainment area are required to comply with Federal Air Conformity rules and regulations of 40 CFR 51/93. Under Air Conformity, a facility (such as Edwards AFB) that initiates a new action (such as the proposed action) must quantify air emissions from stationary and mobile sources associated with that action.

In accordance with the air conformity requirements of 40 CFR 51.853/93.153(b)(1) and KCAPCD Rule 210.7, the *de minimis* levels set for the $O_3$ *serious* nonattainment area of KCAPCD for $O_3$ precursor emission is up to 50 tons per $O_3$ precursor pollutant ($NO_x$ and VOC) per year per action.

In accordance with the air conformity requirements of 40 CFR 51.853/93.153(b)(1) and MDAQMD Rule 2002, the *de minimis* level set for the $O_3$ *severe* nonattainment area of MDAQMD for $O_3$ precursor emissions is up to 25 tons per $O_3$ precursor pollutant ($NO_x$ and VOC) per year per

[5]The U.S. EPS has not yet ruled on *de minimis* levels for *basic* nonattainment areas, but it can be assumed that the same levels would be allowed for *basic* nonattainment areas as are currently allowed for *moderate* nonattainment areas. *Basic* nonattainment areas have less severe air quality issues than *moderate* nonattainment areas and earlier attainment target dates.

action. In accordance with the air conformity requirements of 40 CFR 51.853/93.153(b)(1) and MDAQMD Rule 2002, the *de minimis* level set for the PM10 *moderate* nonattainment area of MDAQMD for PM10 emissions is up to 100 tons per year per action.

In accordance with air conformity requirements of 40 CFR 51.853/93.153(b)(1) and AVAQMD Regulation XIII, the *de minimis* level set for the $O_3$ *severe* nonattainment area of AVAQMD for $O_3$ precursor emissions is up to 25 tons per $O_3$ precursor pollutant ($NO_x$ and VOC) per year per action.

In addition, even if calculated emissions are less than *de minimis* levels, a subsequent comparison must be made. Specifically, the calculated project emissions must be compared to the regional planning emission inventories for each applicable criteria pollutant in the nonattainment area of concern. If the calculated emissions are equal to or greater than 10 percent of the regional planning emission inventory, then the action is considered to be regionally significant and the requirements of air conformity apply. Otherwise, if the calculated emissions are less than both *de minimis* levels and 10 percent of the regional planning emissions inventories, then the requirements of air conformity do not apply to the action. Table 6 shows the 1990 baseline values and the 10-percent threshold values.

### 3.3 Safety and Occupational Health

Health and safety is defined as the protection of workers and the public from hazards. The total accident spectrum encompasses not only injury to personnel, but also damage or destruction of property or products. For worker safety, the boundary of the immediate work area defines the region of influence. At Edwards AFB, the potential health and safety issues associated with implementing the proposed action would include noise and exposure hazards.

**TABLE 6**
**1990 BASELINE AND 10-PERCENT THRESHOLD VALUES**

| | 1990 Baseline Values (tons/year) | | | 10-Percent Threshold (tons/year) | | |
|---|---|---|---|---|---|---|
| **District** | **$NO_X$** | **VOC** | **PM10** | **$NO_X$** | **VOC** | **PM10** |
| **KCAPCD** | 14,965 | 6,205 | N/A | 1,496.5 | 620.5 | N/A |
| **AVAQMD** | 10,220 | 12,775 | N/A | 1,022.0 | 1,277.5 | N/A |
| **MDAQMD** | 41,610 | 16,790 | 34,310 | 4,161 | 1,679 | 3,431 |

Notes:
1. $NO_X$ – oxides of nitrogen
2. VOC – volatile organic compound
3. PM10 – particulate matter less than or equal to 10 microns
4. KCAPCD – Kern County Air Pollution Control District
5. N/A – Not Applicable
6. AVAQMD – Antelope Valley Air Quality Management District
7. MDAQMD – Mojave Desert Air Quality Management District

Source: CARB 1994, *California SIP for $O_3$*. Accessed at http://www.arb.ca.gov/planning/sip/94sip/94sip.htm on 21 June 2004.

### 3.3.1 Regulatory Requirements/Guidance

The Occupational Safety and Health Administration (OSHA) has developed standards to promote a safe working environment. These standards establish general environmental controls, including personal protective equipment, wherever necessary because of hazards, processes, or the environment. Exposure limits for noise, ionizing and nonionizing radiation, and toxic and hazardous substances have been established, as well as requirements for handling and storing compressed gases and flammable liquids. The OSHA Act also provides standards for emergency response to releases of hazardous chemicals and hazardous wastes.

Federal OSHA requirements and AFIs are the applicable regulatory requirements. California OSHA (Cal-OSHA) regulations do not apply to Edwards AFB Department of Defense (DOD) workers (i.e., military and civilian). Independent contractors are responsible for meeting Cal-OSHA requirements. Statutory and regulatory requirements of federal OSHA and Air Force Occupational Safety and Health (AFOSH) Standards, which apply to the safety of workers on Edwards AFB, are enforced locally by Bioenvironmental Engineering, Ground Safety, and the Base Fire Department. In addition, operational safety is supervised by various offices for specific activities.

The OSHA General Duty Clause, section 5(a)1, states that employers will provide a workplace free of recognized hazards that cause or are likely to cause death or serious physical harm.

Title 29 CFR 1910.95, *Occupational Noise Exposure*, states that protection against the effects of noise exposure shall be provided when the sound levels exceed those shown in this regulation.

Title 29 CFR 1910.1025, *Lead*, applies to all occupational exposures to lead in all industries covered by the OSHA Act.

### 3.3.2 Exposure Hazards

Hazardous noise exposure occurs when workers are present in areas where ambient noise levels exceed 85 decibel (dB). To prevent potentially harmful effects to AF and civilian personnel from exposure to hazardous noise, the USAF established a hazardous noise program under AFOSH Standard 48-19, *Hazardous Noise Program*. Under this program, Bioenvironmental Engineering is responsible for accomplishing hazardous noise surveillance to determine if military or DOD civilian personnel working in areas where hazardous noise exposure may occur, require engineering controls, administrative controls, or personal protection, or if potential hazardous noise areas require signage. Non-DOD civilian personnel working on the installation are exempt from AFOSH Standard 48-19, but must comply with applicable federal and state regulations.

Hazardous noise areas exist on the flightline areas and AFRL test stand areas. As such, workers are required to implement hearing protection measures. In addition, signs are posted to alert workers present in these areas. A discussion of project generated noise and potential land use effects can be found in Section 3.1, Land Use.

Elements of the existing environment at Edwards AFB can present human health hazards. Specifically, personnel working outdoors may experience heat stress or hypothermia from exposure, be bitten by venomous snakes and spiders, contract hantavirus from exposure to rodents

and/or their droppings, have limited exposure to pesticides and herbicides used for pest control, and contract valley fever from exposure to soils hosting coccidioidomycosis spores.

An additional safety concern at Edwards AFB for any ground-disturbing activity is the presence of UXO. Edwards AFB has a long history of use as a military installation and UXO items are occasionally found throughout the base, specifically the PIRA and the Explosive Ordnance Disposal (EOD) areas. Due to the spent and unspent ordnance accumulated at targets on the PIRA and at the CAR, lead may be present in the soils around the targets.

## 3.4 Biological Resources

The biological resources discussed include vegetation, wildlife, and sensitive species and habitats throughout Edwards AFB. Sensitive species include those that are listed by the United States Fish and Wildlife Service (USFWS), California Department of Fish and Game (CDFG), or BLM as endangered, threatened, proposed for endangered or threatened status, or candidate species for endangered or threatened status. Plant species considered sensitive by the California Native Plant Society (CNPS) are also discussed in this analysis.

Field surveys of Edwards AFB were conducted in 1992 and 1993 to establish baseline biological resources data. Species-specific surveys were conducted for sensitive species, including the state and federally-listed (threatened) desert tortoise (*Gopherus agassizii*), state-listed (threatened) Mohave ground squirrel (*Spermophilus mohavensis*), and three CNPS 1B plants. These include desert cymopterus (*Cymopterus deserticola*), Barstow woolly sunflower (*Eriophyllum mohavense*), and alkali mariposa lily (*Calochortus striatus*). Random transect surveys were conducted within the five major plant communities to determine dominant and associated plant species, large and small mammal species, avifauna, and herpetofauna commonly found in the various plant communities (Mitchell et al., 1993). These surveys provide the baseline conditions used to evaluate the associated impacts from cultural resources management activities. These field surveys were repeated in 2003 for the 60 established Habitat Quality Analysis (HQA) study plots, 12 of which were resurveyed in 2004. Data collected from the 2003 surveys are being compared with the data from the 1992/1993 surveys to determine species population and diversity trends. According to Integrated Natural Resources Management Plan (INRMP) requirements, surveys for all 60 HQA plots will be repeated every 10 years (AFFTC 2004b). Comparisons of the data will be used to determine the health and trend of the ecosystem (plants and animals) with respect to AF activities and operations.

### 3.4.1 Regulatory Requirements/Guidance

The *Endangered Species Act of 1973* (ESA) (16 USC 1531−1544) provides a framework for the protection of endangered and threatened species. Critical habitat is defined in the ESA as the geographic area containing physical or biological features essential to the conservation of a listed species or an area that may require special management considerations or protection.

The *Migratory Bird Treaty Act* (MBTA) of 1918 (16 USC 703−712), as amended, provides for federal protection of all migratory bird species, their active nests, and eggs. Permits are required to remove these birds and their nests from their roosting and nesting areas.

The *Sikes Act* (16 USC 670a−670o), as amended, provides for cooperation between the Departments of the Interior and Defense and state agencies in planning, developing, and maintaining fish and wildlife resources on military reservations throughout the United States.

Air Force Instruction 32-7064*, Integrated Natural Resources Management*, implements Air Force Policy Directive (AFPD) 32-70, Environmental *Quality*, and Department of Defense Directive (DODD) 4700.4, *Natural Resources Management*. Air Force Instruction 32-7064 explains how to manage natural resources on AF property. The INRMP is a key tool for managing the installation's natural resources.

### 3.4.2 Vegetation Community

The base is described in terms of six major zonal habitats: creosote bush scrub, halophytic-phase saltbush scrub, *Hymenoclea Lycium* scrub (not considered a separate habitat in the 1992 to 1993 surveys), Joshua tree woodland, lakebeds, and xerophytic-phase saltbush scrub. The base also supports several azonal habitats such as clay pans, dunes, and mesquite woodlands. For a complete description of the habitats on Edwards AFB, see the *Integrated Natural Resources Management Plan Update* (AFFTC 2004b) and the *Biological Resources Environmental Planning and Technical Report Basewide Vegetation and Wildlife Surveys and Habitat Quality Analysis* (Mitchell et al. 1993). These habitats support a variety of plants and animals. For a complete list of plant species at Edwards AFB, see *Plant Species of Edwards Air Force Base* (Charlton 1994).

### 3.4.3 Wildlife Community

The base provides habitat for typical desert wildlife species, for a list of known common animal species identified on Edwards AFB see the *Biological Resources Environmental Planning and Technical Report Basewide Vegetation and Wildlife Surveys and Habitat Quality Analysis* (Mitchell et al. 1993).

### 3.4.4 Endangered, Threatened, and Sensitive Species Community

Focused surveys have been conducted for several sensitive plant and wildlife species on Edwards AFB. Table 7 lists the species considered sensitive by the USFWS, CDFG, BLM, and/or the CNPS that are known to occur on base. This table also specifies the status of each species.

While there are several species of interest on Edwards AFB, cultural resources management activities would have the potential to affect very few. The desert tortoise (*gopherus agassizii*) is a large herbivorous reptile whose native range includes the Sonoran and Mojave deserts of southern California, southern Nevada, Arizona, extreme southwestern Utah, and Sonora and northern Sinaloa, Mexico. This species is listed by the USFWS and the CDFG as threatened. The desert tortoise is the only resident federally-listed species with legally required mandates on management practices.

In 1994, the USFWS designated portions of the base as "desert tortoise critical habitat" (USFWS 1994a). Desert tortoise critical habitat encompasses approximately 60,800 acres in the

**TABLE 7**
**SENSITIVE SPECIES CONFIRMED ON EDWARDS AFB**

| Scientific Name | Common Name | Federal Status | State Status | CNPS Status |
|---|---|---|---|---|
| **Birds** | | | | |
| *Accipiter cooperi* | Cooper's Hawk | None | CS | NA |
| *Aquila chrysaetos* | Golden Eagle | Golden and Bald Eagle Act | CS | NA |
| *Haliaeetus leucocephalus* | Bald Eagle | FT | SE | NA |
| *Buteo regalis* | Ferruginous Hawk | FSS | CS | NA |
| *Circus cyaneus* | Northern Harrier | None | CS | NA |
| *Falco peregrinus anatum* | Peregrine Falcon | Delisted | SE | NA |
| *Falco mexicanus* | Prairie Falcon | None | CS | NA |
| *Asio flammeus* | Short-eared Owl | None | CS | NA |
| *Asio otus* | Long-eared Owl | None | CS | NA |
| *Speotyto cunicularia* | Burrowing Owl | None | CS | NA |
| *Chaetura vauxi* | Vaux's Swift | None | CS | NA |
| *Toxostoma lecontei* | Le Conte's Thrasher | None | CS | NA |
| *Lanius ludovicianus* | Loggerhead Shrike | None | CS | NA |
| **Reptiles and Amphibians** | | | | |
| *Gopherus agassizii* | Desert Tortoise | FT | ST | NA |
| *Sauromalus obesus* | Chuckwalla | FSS | CS | NA |
| *Phrynosoma coronatum frontale* | California Horned Lizard | None | CS | NA |
| **Mammals** | | | | |
| *Eumops perotis californicus* | California Mastiff Bat | None | CS | NA |
| *Euderma maculatum* | Spotted Bat | None | CS | NA |
| *Plecotus townsendii* | Townsend's Big-eared Bat | None | CS | NA |
| *Antrozus pallidus* | Pallid Bat | None | CS | NA |
| *Nyctimops macrotis* | Big Free-tailed Bat | None | CS | NA |
| *Nyctimops femorosaccus* | Pocketed Free-tailed Bat | None | CS | NA |
| *Spermophilus mohavensis* | Mohave Ground Squirrel | None | ST | NA |
| *Taxidea taxus* | American Badger | None | CS | NA |
| **Plants** | | | | |
| *Calochortus striatus* | Alkali Mariposa Lily | None | None | 1B |
| *Cymopterus deserticola* | Desert cymopterus | None | None | 1B |
| *Eriophyllum mohavense* | Barstow Woolly Sunflower | None | None | 1B |
| *Loeflingia squarrosa* var. *artemisiarum* | Sage-like Loeflingia | None | None | 1B |
| *Astragalus preussii* var. *laxiflorus* | Lancaster Milkvetch | None | None | 1B |

Notes: 1. Federal Status
FT – Federally threatened
FSS – Bureau of Land Management/Forest Service sensitive
2. State Status
ST – Listed as state of California threatened
CS – California species of special concern
3. California Native Plant Society (CNPS) Status
1B – Plants rare, threatened or endangered in California
4. NA – Not Applicable

eastern and southeastern portions of Edwards AFB on the PIRA (figure 4). Some of the activities associated with the proposed project would occur within desert tortoise critical habitat.

The PIRA is divided into three management zones that roughly correspond with mission use. The heaviest use within the PIRA is designated zone 1. Approximately 4,480-acres of critical habitat are located within zone 1. Activities within zone 1 are not expected to preclude the recovery of desert tortoise in the western Mojave Desert. Approximately 25,960 acres of critical habitat fall within an area designated zone 2, which supports moderate tortoise densities. The moderate level of activity currently occurring within this zone is expected to continue at its current rate. Zone 3 encompasses 30,360 acres of the PIRA and contains the highest tortoise densities on base. Zone 3 provides the highest level of desert tortoise protection, and very little activity occurs within this area. Zone 3 also includes the Mount Mesa area, an area designated by Edwards AFB as a desert tortoise buffer area.

The Mohave ground squirrel occupies a restricted range in the northwestern Mojave Desert in parts of San Bernardino, Los Angeles, Kern, and Inyo counties, California. This diurnal species is active aboveground only in spring and early summer before entering aestivation. This species is listed as threatened by the CDFG.

The burrowing owl is the only sensitive avian species potentially affected by cultural resources activities. This species is listed as a California species of special concern and is also protected by the MBTA.

Five sensitive plant species (CNPS 1B) are known to occur on Edwards AFB, desert cymopterus (*Cymopterus deserticola*), Barstow woolly sunflower (*Eriphyllum mohavense*), sage-like loeflingia (*Loeflingia squarrosa* var. *artemisarum*), Lancaster milkvetch (*Astragalus preussii* var. *laxiflorus*), and alkali Mariposa lily (*Calachortus striatus*). These plants are considered rare or endangered in California and elsewhere. Surveys conducted in 1995 identified several areas containing desert cymopterus, Barstow woolly sunflower, and alkali mariposa lily (Sawasaki et al. 1995a, b, and c).

### 3.4.5 Sensitive Habitats

Sensitive habitats on Edwards AFB include plant communities that are unusual or of limited distribution and areas utilized seasonally by wildlife (e.g., migration routes, breeding areas, or critical seasonal habitat).

Numerous playas, claypans, and ephermal pools support freshwater shrimp, hydrophytic vegetation, waterfowl, and shorebirds during seasonal inundation. Five species of freshwater shrimp have been identified including: clam shrimp (*Eocyzicus digueti*), tadpole shrimp (*Lepidurus lemmoni*), and three species of fairy shrimp (*Branchinecta mackini*, *B. gigas,* and *B. lindahli*) (AFFTC 1992). For a list of bird species at Edwards AFB, see the *Biological Resources Environmental Planning and Technical Report Basewide Vegetation and Wildlife Surveys and Habitat Quality Analysis* (Mitchell et al. 1993).

The *Los Angeles County General Plan* has identified two Significant Ecological Areas (SEAs) on the base, Edwards AFB (SEA 47) and Rosamond Lake (SEA 50) (County of Los Angeles 1993). Significant Ecological Area 47 contains botanical features that are unique and limited in

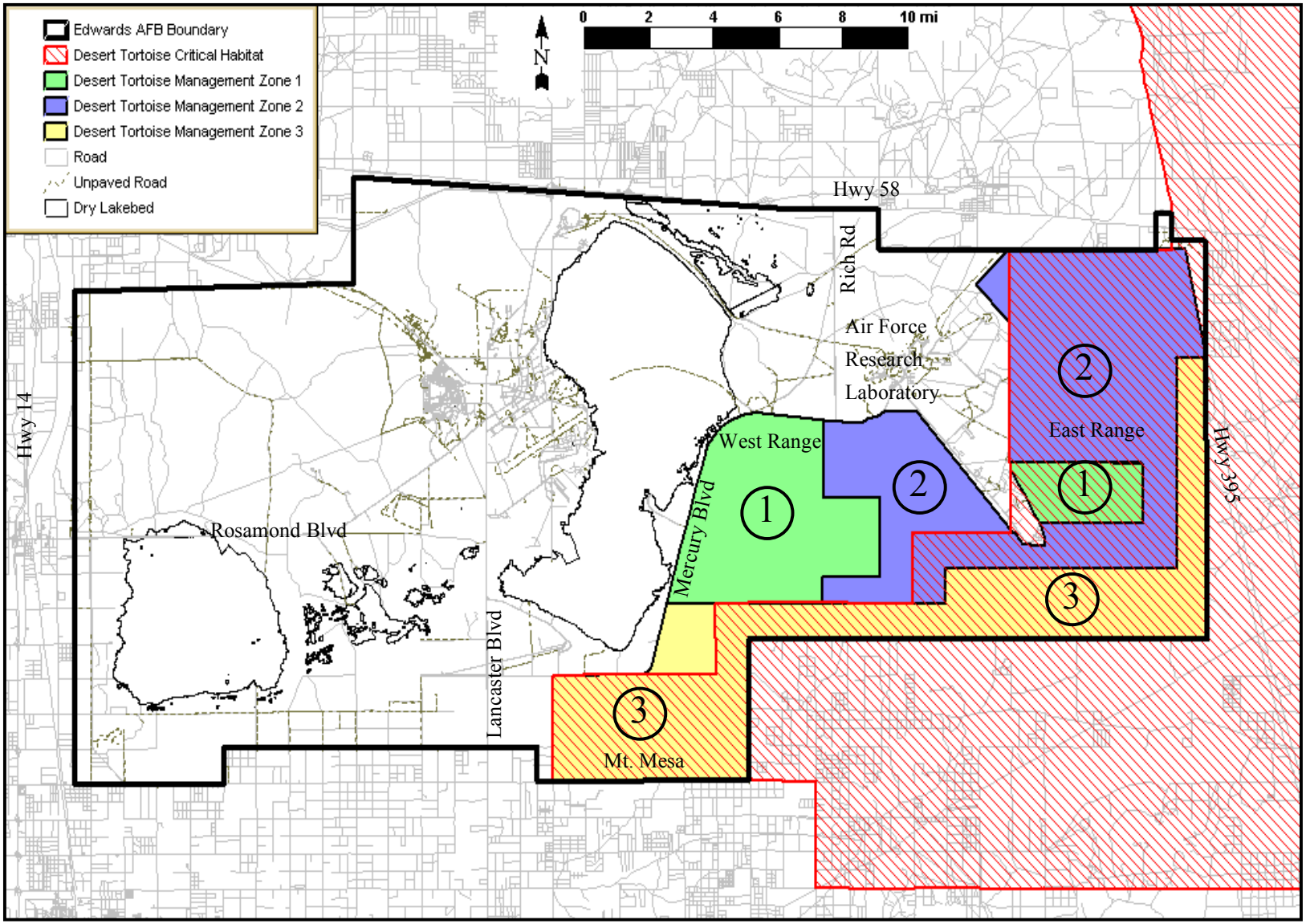


**Figure 4 Desert Tortoise Critical Habitat and Management Zones on the PIRA**

distribution in Los Angeles County. They include the only good stands of mesquite (*Prosopis glandulosa*) in Los Angeles County. The area contains fine examples of creosote bush scrub, alkali sink, and the transition vegetation between the two. Mesquite woodlands provide habitat for a variety of mammals, birds, and reptiles.

Significant Ecological Area 50 is the best example of the shadescale scrub and alkali sink biotic communities in Los Angeles County. It also contains Piute Ponds in the southwestern corner of the base. Piute Ponds supports a variety of wildlife, especially birds. These ponds provide a stopover area for migratory birds.

## 3.5 Cultural Resources

Cultural resources are defined by AFI 32-7065, *Cultural Resources Management*, as any historical, archaeological, or American Indian artifacts and properties of interest. Cultural resources at Edwards AFB include archaeological resources (including those from prehistoric and historic periods), historic period resources (including structures and objects), and traditional cultural places.

The consultation process with American Indian tribes associated with Edwards AFB is ongoing as part of the overall AF program. Edwards AFB has also initiated contacts with tribal governments for this specific proposed action. Copies of the EA and ICRMP have been sent directly to the designated points of contact as part of the consultation process. This proposed action has also been coordinated with the California SHPO.

As of September 2004, 3,060 archaeological sites have been identified on Edwards AFB. Of these, 913 sites have been evaluated for listing on the National Register of Historic Places (National Register); 199 of these sites have been found eligible or potentially eligible for listing on the National Register either on individual merit or as contributing elements of historic districts. A total of 1,664 sites represent the prehistoric period, and 1,396 date to the historic period. Prehistoric period sites include villages, temporary camps, rock shelters, milling stations, lithic deposits, quarries, cremations, rock features, and rock art. Historic period archaeological sites include refuse deposits, rock cairns, railroad grades, roads and trails, abandoned mines and homesteads, buildings and facilities, rock alignments, wells, and military sites. There is one National Historic Landmark on Edwards AFB, the northern portion of Rogers Dry Lake.

### 3.5.1 Regulatory Requirements/Guidance

The *National Historic Preservation Act* (NHPA) of 1966, as amended (16 USC 470 et seq.), provides for the establishment of the National Register and authorizes the establishment of criteria to determine the eligibility of cultural sites for listing on the National Register. Section 106 of the NHPA requires federal agencies to evaluate the effects of their activities and programs on eligible cultural resources (which include prehistoric and historic archaeological resources, historic resources, and traditional cultural places). Section 110 of the NHPA directs federal agencies to undertake actions necessary to minimize harm to cultural resources under their ownership or control, or affected by their activities and programs. Compliance with 16 USC 470 et seq., *NHPA*; 36 CFR 800, *Protection of Historic Properties*; and AFI 32-7065, *Cultural Resources Management*, at Edwards AFB is coordinated by the Base Historic Preservation Officer (BHPO).

The *Archaeological Resources Protection Act of 1979* (ARPA) (16 USC 469) was intended to address the growing concern about the plundering of archaeological and historic sites. The act makes it illegal to remove any archaeological resources from federal or Indian lands without a permit. Violations of the ARPA can result in fines of up to $250,000 and up to 5 years imprisonment.

The *Native American Graves Protection and Repatriation Act* (NAGPRA) (25 USC 3001 et seq.) requires federal agencies and institutions (e.g., museums) that receive federal funding to inventory their collections of American Indian human remains, funerary objects, sacred objects, and objects of cultural patrimony. American Indians must be given the opportunity to reclaim these items. The act requires consultations with American Indians regarding the avoidance of archaeological burial sites. It requires halting excavation and consulting with representatives of local American Indian groups if a burial is encountered in the course of archaeological or other excavations. The act also makes it illegal for anyone to buy or sell American Indian human remains or sacred objects.

The *American Indian Religious Freedom Act* (AIRFA) (42 USC 1996) establishes protection and preservation of traditional religions of American Indians.

The *Antiquities Act of 1906* (16 USC 431−433) prohibits the excavation of antiquities from public lands without a permit from the Secretary of the Interior.

The *Archaeological and Historical Preservation Act of 1974* (16 USC 469−469c) requires all agencies to report to the Secretary of the Interior if any of their projects may cause the loss of "significant scientific, prehistorical, historical, or archaeological data." The act gives them the choice of recovering threatened data themselves or asking the Department of the Interior to do it for them, and it authorizes them to transfer up to 1 percent of the cost of the project to the Department of the Interior to support salvage.

Air Force Instruction 32-7065, Cultural *Resources Management*, implements AFPD 32-70, *Environmental Quality*, and DODD 4710.1, *Archaeological and Historic Resources Management*.

Department of Defense Instruction 4715.3 *Environmental Conservation Program,* implements policy, assigns responsibilities, and prescribes procedures for the integrated management of natural and cultural resources on property under DOD control.

### 3.5.2 Management Regions

Edwards AFB is a large installation that supports a diversity of resources and mission activities. In developing an integrated cultural resources management policy, the base property has been divided into smaller, more manageable regions (1 through 5) (figure 5). Management strategies have been evaluated for each region to determine cultural/historical significance. Specific projects and activities in each region are designed to meet the management goals identified in the ICRMP. In delineating management regions at Edwards AFB, consideration was given to the types of resources found in each region and activities, both current and planned/proposed.

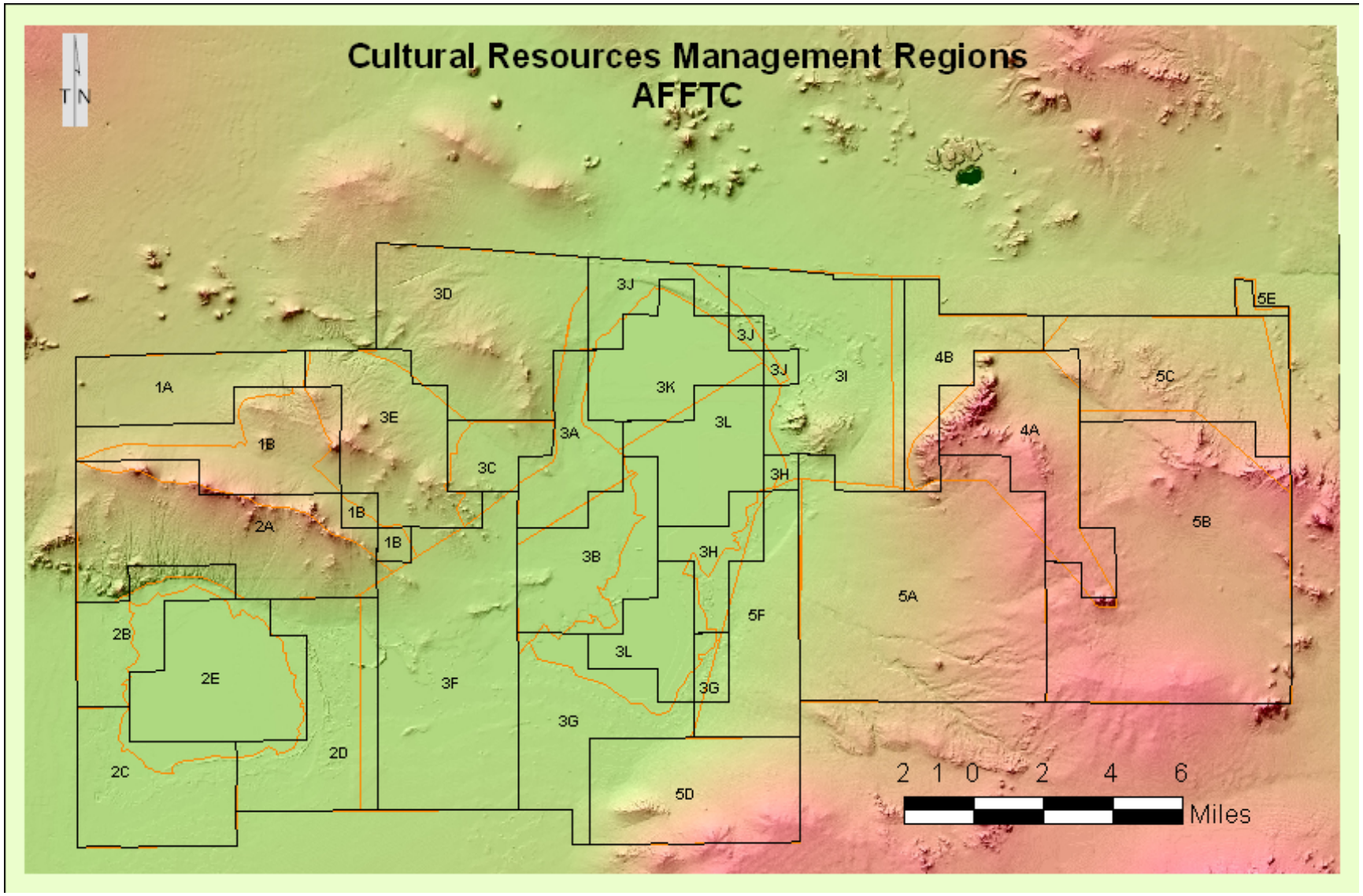


**Figure 5 Management Areas Delineated on Edwards AFB**

Following is a list of the reports regarding cultural resources management regions.

a. *Overview and Management Plan for Cultural Resources Management Region 2, Edwards Air Force Base, Kern and Los Angeles Counties, California* (Greene 2000).

b. *Overview and Management Plan for Cultural Resources Management Region 3, Edwards AFB, Kern and Los Angeles Counties, California* (Computer Sciences Corporation 2001).

c. *Overview and Management Plan for Cultural Resources Management Region 5, Volumes 1 and 2, Edwards Air Force Base, Kern and Los Angeles Counties, California* (McGetrick et al. 2001).

d. *Overview and Results of the Sample Survey for Cultural Resources Management Region 1, Edwards Air Force Base, California* (McGetrick et al. 2003).

e. *Overview and Results of the Sample Survey for Cultural Resources Management Region 4, Edwards Air Force Base, Kern and San Bernardino Counties, California* (McGetrick et al. 2003).

## 3.6 Geology and Soils

Geologic resources consist of naturally formed minerals, rocks, and unconsolidated sediments. Soil refers to the uppermost layers of surficial geologic deposits and is developed by the weathering of those deposits. Concerns associated with the geologic setting at Edwards AFB that could either affect or be affected by a proposed project, include: topography, material site use (mining), ERP site disturbance, seismicity, and land subsidence.

The geologic setting in the vicinity of the Edwards AFB area is characterized by three major rock types or geologic complexes: a basement complex of igneous and metamorphic rocks; an intermediate complex of continental volcanic and sedimentary rocks; and valley fill deposits. The basement complex is of pre-Tertiary age and includes quartz monzonite, granite, gneiss, schist, and other igneous and metamorphic rocks. These rocks crop out in the highlands surrounding the playa areas and occur beneath the unconsolidated deposits of the playa. The intermediate complex, with limited exposure in the Edwards AFB vicinity, is of Tertiary age and includes a variety of sedimentary and volcanic rock types (Dutcher and Worts 1963).

The United States Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS) has completed a soil survey of Edwards AFB for the United States Army Corps of Engineers (USACE) (*Soil Survey of Edwards Air Force Base, California*) (USDA NRCS 1996). Based on this survey, the soils at Edwards AFB can be characterized as predominantly alkaline, consisting of loams, sandy loams, and loamy sands, all of which are susceptible to wind and water erosion.

According to the *Soil Survey of Edwards Air Force Base, California*, the soils at Edwards AFB are given erosion hazard ratings of slight to severe for wind erosion and slight to moderate for water erosion.

A discussion of air quality concerns associated with wind erosion can be found in Section 3.2, Air Quality.

## 3.7 Socioeconomics

Socioeconomic resources are the economic, demographic, and social assets of a community. Key elements include fiscal growth, population, employment, housing, schools, and environmental justice.

For the purpose of this EA, those counties, or portions of counties, in which the proposed action will occur, define the boundary of the socioeconomic environment. The economic impact region (EIR) includes all areas within this boundary. The EIR for an impacted community is fundamentally important to the analysis because it defines the area in which changes in fiscal growth, population, labor force and employment, housing stock and demand, and school enrollment will be assessed. The EIR for Edwards AFB is that area located within 75 miles of Main Base, and includes portions of Los Angeles, Kern, and San Bernardino counties. However, a majority of potential socioeconomic impacts from base activities would be expected to occur within the Antelope Valley area (figure 6).

Social institutions[6], defined ways of life[7], and the availability of recreation activities all influence the way individuals and communities view their quality of life.

[6]Social institutions encompass educational, family, economic, military, religious, and recreational/leisure.
[7] Defined ways of life encompass subsistence hunting and fishing, stability and change, cohesion and conflict, and community identity.

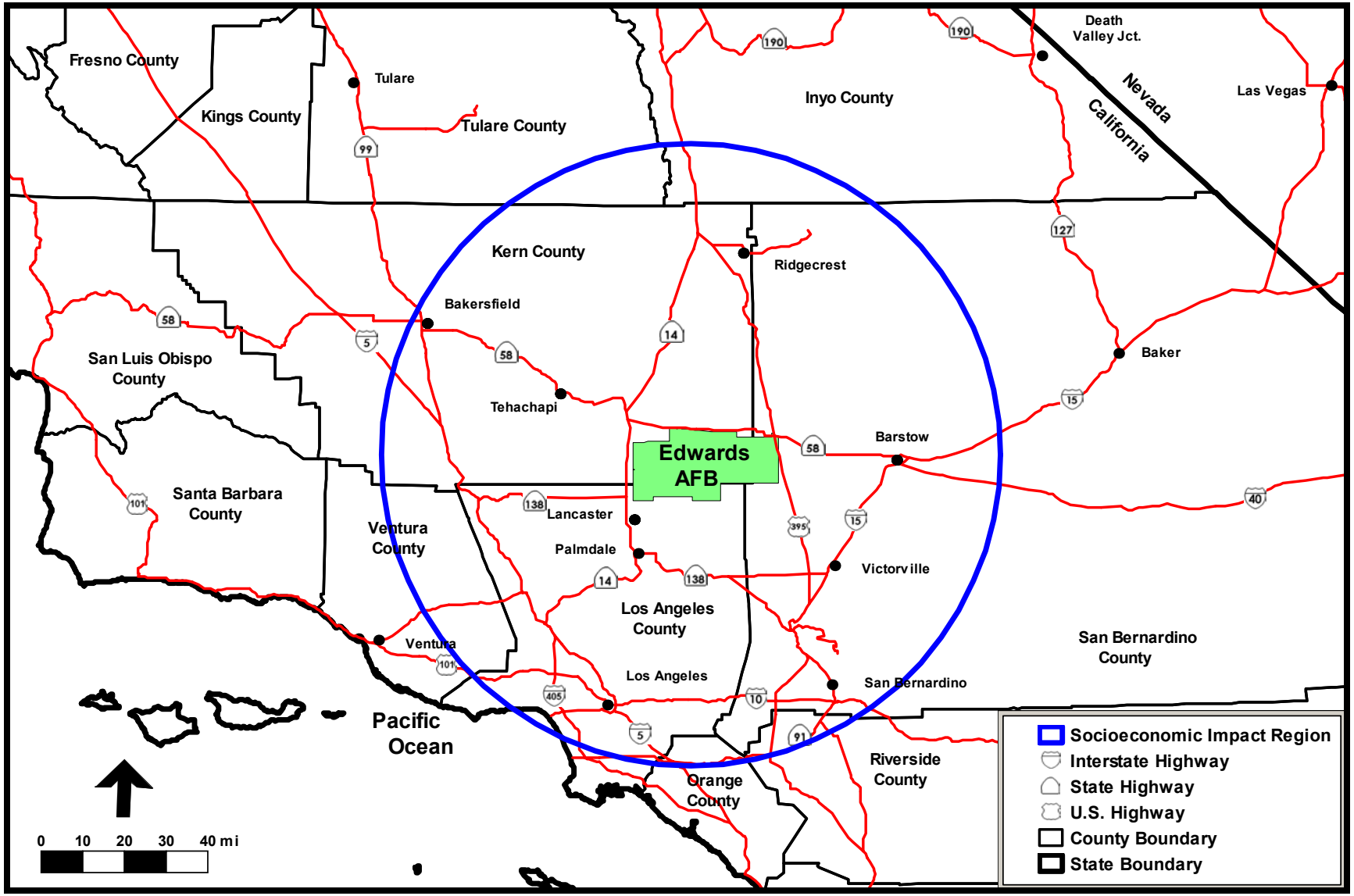


**Figure 6 Socioeconomic Impact Region Map**

# 4.0 ENVIRONMENTAL CONSEQUENCES

This section of the document assesses known, potential, and reasonably foreseeable environmental consequences related to the development and implementation of an ICRMP and managing cultural/historical resources at Edwards AFB. This chapter is organized into subsections that discuss each environmental resource. General overall impacts to these resources are discussed, including the impacts of the No Action Alternative (status quo/low level of active management plan). In addition to impacts in the United States, guidance from CEQ states that agencies "must include an analysis of reasonably foreseeable transboundary effects of proposed actions in their analysis of proposed actions in the United States." Actions that impact migratory species, air quality, watersheds, and other components of natural ecosystems are types of actions that may have impacts across international borders. Should any potential impacts be identified, agencies with relevant expertise in the affected country would be contacted.

Department of Defense Instruction 4715.3, in conjunction with AFI 32-7065, requires an ICRMP to provide goals and objectives for managing cultural/historical resources including a course of action designed to improve the management of Edwards AFB's cultural/historical resources. An ICRMP should allow flexibility in management options, as more information becomes available from ongoing identification, surveying, and recording/documenting of historic/cultural sites. The impacts identified in this analysis range from no impact to either beneficial or minor adverse impacts. An ICRMP is intended to be a "living" document that focuses on a 5-year planning period based on past and present actions. Short-term management practices included in the plan have been developed without compromising long-range cultural resources goals and objectives (a summary of the specific goals by resource area may be found in the ICRMP). The selected alternative plan will be reviewed annually and updated every 5 years. Additional environmental analyses may be required as new management measures are developed and incorporated into the plan to stay current with the changes at the installation. The alternatives and their impacts are evaluated in this EA at the programmatic level of the plan.

Adaptive management relies on the ability to accurately determine what is and is not working and to make changes in management practices through time. An end state with a rigorously applied scientific method leading to a thorough understanding of the cultural resources on Edwards AFB is the goal.

## 4.1 Land Use

All of the alternatives considered would be compatible with the *Edwards AFB General Plan* (AFFTC 2001a). A few projects for cultural resources management would be close enough to flightline operations to potentially produce FOD issues**.**

### 4.1.1 Alternative A Impacts (Preferred Alternative)

#### 4.1.1.1 Foreign Object Damage Control

Debris, such as nuts, bolts, screws, wood, trash, or pieces of concrete or asphalt may end up on runways, taxiways, or aprons as a result of project activities occurring on or near the flightline. These objects could puncture tires, damage engines, or be blown by helicopter rotorwash. This could cause damage to aircraft and helicopters, and possible injury or death to personnel.

However, continued implementation of standard practices and existing policies would reduce the potential for these impacts. Therefore, no significant impact is anticipated as a result of FOD.

#### 4.1.1.2 Direct/Indirect Effect

Cultural resources management activities would not have a direct effect on land use. Cultural resources management activities located in the flightline area would have an indirect effect by increasing the potential for FOD hazards during project activities.

#### 4.1.1.3 Short-Term Use versus Long-Term Productivity

The nature of the cultural resources management activities would not incur a short- or long-term effect on land use.

### 4.1.2 Alternative A Minimization Measures (Preferred Alternative)

The following minimization measures are required:

a. All project personnel shall use standard operating procedures for the prevention of FOD, as identified in AFI 21-101, *Maintenance Management of Aircraft*. In addition, AFJMAN 24-306, *Manual for the Wheeled Vehicle Driver*, and AFFTCI 10-2, *Control of Vehicles on the Airfield (Other Than Special Purpose Equipment)*, shall be followed.

b. Activities on the flightline have the potential to leave objects on taxiways or runways that could cause damage to aircraft and interrupt flightline operations. The proponent/ contractor shall contact Airfield Management for FOD reduction guidelines.

c. To avoid mission-related conflicts, activities on the flightline require a 10- to 14-day advance notice to Airfield Management. The proponent/contractor shall contact Airfield Management for coordination requirements.

### 4.1.3 Alternative B Impacts

Impacts associated with this alternative are anticipated to be similar to those under alternative A, but would occur with more frequency.

### 4.1.4 Alternative B Minimization Measures

The minimization measures would be the same as those described for alternative A.

### 4.1.5 Alternative C Impacts

Impacts associated with this alternative are anticipated to be similar to those under alternative A, but would occur with less frequency.

### 4.1.6 Alternative C Minimization Measures

The minimization measures would be the same as those described for alternative A.

## 4.2 Air Quality

### 4.2.1 Alternative A Impacts (Preferred Alternative)

A short-term degradation in air quality may be experienced during project activities. Fugitive dust emissions (i.e., PM10) could be generated during excavation activities and project personnel driving off of established roadways. Use of associated motor vehicles could cause degradation in air quality from engine emissions.

Total air emissions for the proposed action from all sources (mobile and stationary) are estimated to be 0.15 tons of $NO_x$ and 0.35 tons of VOC and are considered to be *de minimis* under 40 CFR 51.853/93.153(b)(1). A copy of the emission calculations can be found in appendix A. The proposed action would comply with all applicable federal, state, and local laws and regulations. Compliance with the minimization measures listed in Section 4.2.2, Alternative A Minimization Measures, would further reduce anticipated impacts due to criteria pollutant or ozone precursor pollutant air emissions. Therefore, no significant impacts are anticipated.

The relevant and applicable *de minimis* levels for criteria pollutant emissions in all air districts are already less than the corresponding 10-percent threshold limits. The proposed action has emissions that are below *de minimis* levels. Thus, the proposed action would not have a regionally significant impact.

#### 4.2.1.1 Direct/Indirect Effects

Fugitive dust emissions generated during excavation activities and the use of motor vehicles to drive personnel off of established roadways would directly affect local air emission levels. However, based on air emission calculations, emission levels would be at or below *de minimis* levels. There would be no indirect effect to local air quality from cultural resources management activities.

#### 4.2.1.2 Short-Term/Long-Term Effects

Air quality levels would be affected by excavation activities and the use of motor vehicles and would be short-term and insignificant based on air emission calculations. Because emission levels would be at or below *de minimis* levels, the potential for long-term effects to regional and local air quality from cultural resources management activities would be insignificant.

### 4.2.2 Alternative A Minimization Measures (Preferred Alternative)

The following minimization measures are required.

a. The proposed project shall comply with all applicable rules and regulations as identified in AFI 32-7040, *Air Quality Compliance*.

b. All earthwork activities shall be planned and conducted to minimize the duration that soils are left unprotected. The extent of the area of disturbance necessary to accomplish the project should be minimized. Exposed surfaces should be periodically sprayed with water or soil binder.

c. Ground-disturbing activities should be delayed during high-wind conditions (over 25 mph).

### 4.2.3 Alternative B Impacts

Total air emissions for the proposed action from all sources (mobile and stationary) are estimated to be slightly more than alternative A and are considered to be *de minimis* under 40 CFR 51.853/93.153(b)(1). The proposed action would comply with all applicable federal, state, and local laws and regulations. Compliance with the minimization measures listed in Section 4.2.2, Alternative A Minimization Measures, would further reduce anticipated impacts due to criteria pollutant or ozone precursor pollutant air emissions. Therefore, no significant impacts are anticipated.

### 4.2.4 Alternative B Minimization Measures

The minimization measures would be the same as those described for alternative A.

### 4.2.5 Alternative C Impacts

Total air emissions for the proposed action from all sources (mobile and stationary) are estimated to be slightly less than alternative A and are considered to be *de minimis* under 40 CFR 51.853/93.153(b)(1). The proposed action would comply with all applicable federal, state, and local laws and regulations. Compliance with the minimization measures listed in Section 4.2.2, Alternative A Minimization Measures, would further reduce anticipated impacts due to criteria pollutant or ozone precursor pollutant air emissions. Therefore, no significant impacts are anticipated.

### 4.2.6 Alternative C Minimization Measures

The minimization measures would be the same as those described for alternative A.

## 4.3 Safety and Occupational Health

### 4.3.1 Alternative A Impacts (Preferred Alternative)

Elements of the existing environment and activities associated with cultural resources excavation can pose health and safety issues for personnel during proposed project activities. The potential health and safety issues associated with excavation activities include possible exposure to hazardous noise levels and hazardous materials (including propellants and munitions). The potential health and safety issues associated with excavation activities would include the potential exposure to lead in and around the PIRA and CAR target areas and hazardous noise from flightline and AFRL activities. Another concern is cultural resources work occurring in ERP sites. Through the NEPA process, ERP sites would be identified. However, cultural resources work would be limited to areas where there is no ERP site contamination. Compliance with all applicable laws and regulations will minimize health and safety hazards to personnel.

Cultural resources activities have the potential to expose personnel to conditions that can cause heat stress or hypothermia from exposure, venomous snake and spider bites, or contract hantavirus

and/or valley fever from exposure to soils hosting spores. Compliance with all applicable laws and regulations and the contractor's Health and Safety Plan (HASP) will minimize health and safety hazards to personnel.

#### 4.3.1.1 Direct/Indirect Effects

Cultural resources management activities would have the direct effect of potentially exposing personnel to hazardous noise levels, hazardous materials (including propellants and munitions), and hazardous environmental conditions. Using appropriate protective measures would minimize the potential risk to human health. Cultural resources management activities would have no indirect effect to safety and occupational health.

#### 4.3.1.2 Short-Term Use versus Long-Term Productivity

Cultural resources management activities would potentially expose personnel to hazardous noise levels, hazardous materials (including propellants and munitions), and hazardous environmental conditions, thereby causing a short-term effect. Cultural resources management activities would not have a long-term effect to safety and occupational health.

### 4.3.2 Alternative A Minimization Measures (Preferred Alternative)

The following minimization measures are required.

a. All personnel present within hazardous noise areas shall follow the applicable OSHA hearing protection guidelines.

b. When project activities are located within the PIRA, the proponent/contractor shall coordinate project activities with Downfall.

c. All field workers shall undergo UXO awareness training prior to commencement of fieldwork.

d. Due to the type of operations conducted on and within the PIRA, there is a potential to encounter live and nonexpended ordnance. If material suspected to be hazardous is found during project activities, the proponent/contractor shall notify Downfall.

e. Project personnel shall be aware of the potential for lead exposure when conducting excavations on the PIRA or CAR target areas. Follow HASP procedures for metal contamination.

f. Compliance with all applicable OSHA, AFOSH, and Cal-OSHA rules and regulations will minimize exposure hazards to personnel. Follow HASP procedures for exposure conditions.

### 4.3.3 Alternative B Impacts

Impacts associated with this alternative are anticipated to be similar to those under alternative A, but would occur with more frequency.

### 4.3.4 Alternative B Minimization Measures

The minimization measures would be the same as those described for alternative A.

### 4.3.5 Alternative C Impacts

Impacts associated with this alternative are anticipated to be similar to those under alternative A, but would occur with less frequency.

### 4.3.6 Alternative C Minimization Measures

The minimization measures would be the same as those described for alternative A.

## 4.4 Biological Resources

### 4.4.1 Alternative A Impacts (Preferred Alternative)

Cultural resources activities on Edwards AFB have been conducted for several years. The proposed action and alternatives would continue to affect biological resources through the alteration or loss of vegetation and wildlife habitat and the potential for loss of individual desert tortoises, Mohave ground squirrels, burrowing owls, or sensitive plant species.

Under all alternatives considered, the NEPA screening process would provide a methodology to ensure compliance with the natural resources laws and regulations affecting biological resources at Edwards AFB. The level of impact and minimization measures for biological resources was determined by considering:

a. the unique characteristics of biological resources, such as ecologically sensitive areas, or species;
b. the legal requirements for the affected resource;
c. the extent to which the proposed action would add to present and future disturbances in the area; and
d. the potential of the affected resource to recover through natural population or habitat recovery or through artificial means, such as revegetation.

#### 4.4.1.1 Vegetation Community

Cultural resources activities would involve little off-road vehicle traffic. Off-road vehicle traffic is known to cause soil compaction, increased soil erosion, and a reduction in seedling establishment (Kakiba and Vogl 1986). Ground-disturbing activities (i.e., excavation) may result in changes in plant diversity, density, and cover. These changes would be dependent upon the intensity and frequency of cultural resources activities and local environmental conditions such as topography, climate, and soil type (Kakiba and Vogl 1986).

Due to the disturbance history of many of the cultural resources sites, cultural resources activities would be expected to create minimal impacts to general vegetation (see section 3.4.2).

#### 4.4.1.2 Wildlife Community

Cultural resources management activities on parts of the PIRA are within critical desert tortoise habitat. Within critical habitat, desert tortoise population densities are higher than those typically found in other areas on base. Cultural resources management activities also have the potential to negatively impact areas within critical habitat through temporary and/or permanent habitat disturbance. These impacts may be direct by physically injuring or killing individuals, or indirect by disturbing habitat or otherwise creating conditions that are adverse to species success.

No adverse impacts to general wildlife species are expected to occur as a result of the implementation of alternative A.

#### 4.4.1.3 Endangered, Threatened, and Sensitive Species Community

Off-road vehicle traffic associated with cultural resources activities may impact desert tortoises, as well as other ground-dwelling species. These impacts may be direct by physically injuring or killing individuals, or indirect by disturbing habitat or otherwise creating conditions that would adversely affect the species' ability to survive and reproduce.

Personnel may encounter birds and their nests during activities in support of cultural resources activities. Common bird species such as the common raven (*Corvus corax*), house finch (*Carpodacus mexicanus*), and barn owl (*Tyto alba*) typically nest and roost in, on, or near manmade structures. These species, as well as many others, are protected under the MBTA (see table 7).

Sensitive plant species (see table 7) may be impacted by cultural resources activities (e.g., during off-road vehicle and excavation activities).

#### 4.4.1.4 Direct/Indirect Effects

Cultural resources management activities would have a direct impact on vegetation and wildlife habitat including the potential for loss of individual desert tortoises, Mohave ground squirrels, burrowing owls, or sensitive plant species. These activities could also indirectly impact wildlife through the disturbance of wildlife habitat.

#### 4.4.1.5 Short-Term Use versus Long-Term Productivity

Impacts to vegetation would be short-term and vegetation recovery should occur in most cases, because cultural resources management activities would generally have a minimal impact to the vegetation community. No long-term impacts to vegetation or wildlife are anticipated.

### 4.4.2 Alternative A Minimization Measures (Preferred Alternative)

The following minimization measures are required.

a. The proponent/contractor shall adhere to the terms and conditions of the following applicable biological opinion. This includes a desert tortoise briefing prior to the start of any project activities.

1) *Biological Opinion for Routine Operations and Facility Construction within the Cantonment Areas of Main and South Bases, Edwards Air Force Base, California* (1-6-91-F-28) (USFWS 1991).

2) *Biological Opinion for the Precision Impact Range Area, Edwards Air Force Base, California* (1-8-94-F-6) (USFWS 1994a).

3) *Biological Opinion for Rocket Motor Testing Program and Support Activities at Phillips Laboratory, Edwards Air Force Base, California* (1-8-97-F-10) (USFWS 1997).

4) *Biological Opinion for Reinitiation of Formal Consultation – Routine Operations, Construction Projects, and Facility Maintenance of Roads, Utilities, and the Runway at the Jet Propulsion Laboratory and North Base Areas of the Air Force Flight Test Center* (1-8-98-F-21R) (USFWS 1998).

b. The following are typical terms and conditions contained in the various Biological Opinions.

1) An education program on the desert tortoise and its status as a listed species shall be presented to personnel, prior to initiating work activities.

2) Preactivity surveys shall be conducted by a qualified biologist in areas containing native vegetation, when necessary, prior to ground-disturbing activities.

3) If any desert tortoises or their burrows are encountered, they shall be avoided to the maximum extent feasible. If avoidance is not possible, a qualified biologist shall excavate burrows and relocate desert tortoises.

4) All workers and visitors to the project site shall inspect under vehicles prior to operating them. If desert tortoises are discovered under parked vehicles, an authorized biologist shall be notified immediately so animals can be relocated to a nearby, safe location. Otherwise, the vehicle shall remain in place until the desert tortoise has moved to a safe location.

5) To protect wildlife, any open excavation units shall be securely covered with weighted plywood covers at the end of each workday.

6) Laydown, parking, and staging areas shall be restricted to previously disturbed areas to the maximum extent possible.

7) All trash and food items shall be promptly contained and regularly removed from project sites to reduce the attractiveness of the areas to common ravens (*Corvus corax*) and other desert tortoise predators.

8) All borrow pit activities that occur between dusk and dawn shall be limited to areas that have already been cleared of desert tortoises by the authorized biologist(s) and are devoid of vegetation. Project activities shall not be permitted between dusk and dawn in areas supporting native vegetation.

c. In the event that a project is not covered under an existing biological opinion, a No Effect Memorandum or consultation with the USFWS shall be required.

d. Only vegetation within or immediately adjacent to, excavation units shall be removed.

e. Structures within the project area shall be surveyed for the presence of nesting birds prior to the start of work activities. A biological monitor may be required. If nesting birds are discovered during work activities, all work must stop at the location of the nest and the proponent/contractor must immediately contact Environmental Management and the contracting officer. Federal employees and contractors are potentially subject to criminal liability and must possess a permit to conduct a depredation activity.

f. A preactivity survey shall be accomplished to determine the presence or absence of sensitive plant species, when necessary, prior to any ground-disturbing activities. A biological monitor may be required during ground-disturbing activities.

### 4.4.3 Alternative B Impacts

#### 4.4.3.1 Vegetation Community

Impacts associated with this alternative are anticipated to be similar to those under alternative A, but would occur with more frequency.

#### 4.4.3.2 Wildlife Community

Impacts associated with this alternative are anticipated to be similar to those under alternative A, but would occur with more frequency.

#### 4.4.3.3 Endangered, Threatened, and Sensitive Species

Impacts associated with this alternative are anticipated to be similar to those under alternative A, but would occur with more frequency.

### 4.4.4 Alternative B Minimization Measures

The minimization measures would be the same as those described for alternative A.

### 4.4.5 Alternative C Impacts

#### 4.4.5.1 Vegetation Community

Impacts associated with this alternative are anticipated to be similar to those under alternative A, but would occur with less frequency.

#### 4.4.5.2 Wildlife Community

Impacts associated with this alternative are anticipated to be similar to those under alternative A, but would occur with less frequency.

#### 4.4.5.3 Endangered, Threatened, and Sensitive Species

Impacts associated with this alternative are anticipated to be similar to those under alternative A, but would occur with less frequency.

### 4.4.6 Alternative C Minimization Measures

The minimization measures would be the same as those described for alternative A.

## 4.5 Cultural Resources

### 4.5.1 Alternative A Impacts (Preferred Alternative)

Cultural resources management activities have the potential to occur near known cultural resources sites. Under this alternative, a more active approach to cultural resources management would create a long-term positive impact to the base's cultural resources program.

#### 4.5.1.1 Direct/Indirect Effects

Cultural resources management activities would directly affect the sites that are evaluated and increase the knowledge of the sites and the areas that are evaluated. These activities could also indirectly affect the cultural resources management program if unrecorded sites are encountered during management activities.

#### 4.5.1.2 Short-Term Use versus Long-Term Productivity

Cultural resources management activities would have a short-term effect on the resources themselves. However, management activities could have a long-term positive effect to the base's cultural resources program, through increasing the knowledge of the prehistory and history of the area.

### 4.5.2 Alternative A Minimization Measures (Preferred Alternative)

The following minimization measures are required:

a. Prior to the start of project activities, a record search of the project area shall be conducted to identify adjacent cultural resources sites, thus reducing the potential for impact to these sites.
b. Excavation units shall be backfilled with the soil that was removed from the unit. If this is not sufficient to fill in the entire excavation unit, culturally sterile soil shall be added.
c. Debris shall not be left in and around cultural sites to protect the site's integrity.

### 4.5.3 Alternative B Impacts

Impacts associated with this alternative are anticipated to be similar to those under alternative A, but would occur with more frequency.

### 4.5.4 Alternative B Minimization Measures

The minimization measures would be the same as those described for alternative A.

### 4.5.5 Alternative C Impacts

Impacts associated with this alternative are anticipated to be similar to those under alternative A, but would occur with less frequency.

### 4.5.6 Alternative C Minimization Measures

The minimization measures would be the same as those described for alternative A.

## 4.6 Geology and Soils

### 4.6.1 Alternative A Impacts (Preferred Alternative)

Environmental Restoration Program sites and areas of concern often undergo long-term monitoring and remediation effort. These sites can be susceptible to damage from adjacent ground-disturbing activities. Numerous wells, which consist of little more than short aboveground pipes, may be positioned to sample groundwater, representing hours of work and precise locations. Valuable equipment may be left on site that is calibrated and easily damaged. The environment of a remediation or monitoring site is sensitive to disturbance, as precise measurements may require controlled conditions. The data obtained is required to accomplish ERP goals and objectives.

#### 4.6.1.1 Direct/Indirect Effects

Cultural resources management activities could occur in the vicinity of ERP monitoring wells and remediation equipment. Consultation with EM would be required prior to the implementation of project activities in order to minimize the potential for damage to the ERP monitoring wells and remediation systems.

#### 4.6.1.2 Short-Term Use versus Long-Term Productivity

Cultural resources management activities have the potential for a short-term effect to the groundwater and/or soil remediation process. Project activities have the potential to damage monitoring wells, lines, and/or remediation systems. Consultation with EM would be required prior to project activities in order to minimize this potential.

### 4.6.2 Alternative A Minimization Measures (Preferred Alternative)

The following minimization measure is required:

a. Project activities could occur in close proximity to ERP equipment, monitoring wells, and underground ERP monitoring lines. Prior to the start of project activities, the proponent shall contact Environmental Management so the location of ERP equipment can be clearly identified to the proponent. Damage to ERP equipment must be avoided.

### 4.6.3 Alternative B Impacts

Impacts associated with this alternative are anticipated to be similar to those under alternative A, but would occur with more frequency.

### 4.6.4 Alternative B Minimization Measures

The minimization measure would be the same as described for alternative A.

### 4.6.5 Alternative C Impacts

Impacts associated with this alternative are anticipated to be similar to those under alternative A, but would occur with less frequency.

### 4.6.6 Alternative C Minimization Measures

The minimization measure would be the same as described for alternative A.

## 4.7 Socioeconomics

### 4.7.1 Alternative A Impacts (Preferred Alternative)

Cultural resources management activities at Edwards AFB would continue to provide an incremental increase in the revenues generated in the surrounding communities. These revenues would be generated as a result of funds spent off base for services (contractors), including restaurants, entertainment, shopping, housing, and the purchase of supplies for ongoing projects.

#### 4.7.1.1 Direct/Indirect Effects

As indicated previously, cultural resources management activities would have a positive direct effect to the economy of the Antelope Valley from increased revenue generation. This impact is not expected to be of much significance as the number of personnel that would conduct management activities would likely not be a large number.

#### 4.7.1.2 Short-Term Use versus Long-Term Productivity

Cultural resources management activities would have a minor short-term effect to the local economy with the increased revenue generated from project personnel and activities. Any long-term effect would be negligible.

### 4.7.2 Alternative A Minimization Measures (Preferred Alternative)

No minimization measures are required.

### 4.7.3 Alternative B Impacts

Impacts associated with this alternative are anticipated to be similar to those under alternative A, but would occur with more frequency.

### 4.7.4 Alternative B Minimization Measures

No minimization measures are required.

### 4.7.5 Alternative C Impacts

Impacts associated with this alternative are anticipated to be similar to those under alternative A, but would occur with less frequency.

### 4.7.6 Alternative C Minimization Measures

No minimization measures are required.

## 4.8 NEPA Mandated Analysis

Cultural resources management activities would affect certain aspects of the environment. These aspects have been evaluated together with five additional impacts, which include:

a. Direct/Indirect Effects,

b. Short-Term Use versus Long-Term Productivity,

c. Cumulative Effects,

d. Unavoidable Adverse Effects, and

e. Irreversible and Irretrievable Commitments of Resources.

The evaluation of direct/indirect effects and short-term/long-term effects are presented in the discussion of the affected environment in Section 4.0, Environmental Consequences. A discussion of cumulative effects, unavoidable adverse effects, and irreversible and irretrievable commitments of resources are discussed separately.

### 4.8.1 Cumulative Impacts

The CEQ regulations implementing NEPA require agencies to consider the potential for cumulative impacts of the proposed actions. "Cumulative impact" is defined in 40 CFR 1508.7 as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions." Past projects, or those implemented or built before 2003, can be considered to be part of the existing environmental conditions baseline presented in this EA. Included within the concept of past projects are all maintenance activities, land development projects, and other actions that occurred before detailed analysis began on this EA. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over time.

Present projects occurring on the base include repavement and regrading of roads, construction of the Base Operations Facility, replacement of the main runway, demolition/replacement of older military family housing, and demolition of surplus family housing units. The long-term cumulative impacts from these activities would be minimal since most of these activities are continuing operations or maintenance to existing structures that are already part of the existing baseline conditions and only a small percentage are new construction.

Proposed projects for the Main Base area of Edwards AFB include renovation and construction of facilities to accommodate additional flight test missions and upgrading the existing munitions

complex. The implementation of these proposed projects is not guaranteed and would depend upon program funding in outlying years.

The pollutant emissions associated with cultural resources management activities, which are *de minimis*, when added with other foreseeable projects would comprise a minimal portion of the baseline emissions. In addition, these emissions, when totaled, are less than 10 percent of the total baseline and, therefore, are not regionally significant. Consequently, significant cumulative impacts to air quality would not occur under any of the alternatives.

For the Preferred Alternative, cultural resources management activities would comply with AFI 32-7065 and DODI 4715.3 which mandate the requirement that every military base have an ICRMP which is a component of the Base Master Plan and the decision document for specific cultural resources compliance procedures. Impacts to physical resources (e.g., noise, air quality, erosion) related to cultural resources management activities would not contribute substantially to cumulative impacts since they are typically localized and temporary. Impacts to natural resources, to cultural resources, and to geology and soils also would not contribute substantially to cumulative impacts since they would be localized and temporary. Long-term impacts to these resources from the implementation of the Preferred Alternative would be minimal, as discussed throughout Section 4.0, Environmental Consequences.

Under alternatives B and C, cumulative impacts would be similar to those anticipated under alternative A.

### 4.8.2 Unavoidable Adverse Impacts

Unavoidable adverse impacts include those that are negative, occurring regardless of any identified minimization measure. The following unavoidable adverse impacts are anticipated under Alternative A, the Preferred Alternative.

a. Air Quality – Pollutant emissions associated with cultural resources management activities are unavoidable, but should be *de minimis*.

b. Safety and Occupational Health – Potential exposure to hazardous noise levels, hazardous materials, and hazardous environmental conditions is unavoidable, but are routinely mitigated by following the contractor's HASP.

Unavoidable adverse impacts associated with alternatives B and C are anticipated to be similar to those listed for alternative A.

### 4.8.3 Short-Term Use versus Long-Term Productivity

Cultural resources management activities at Edwards AFB have been a consistent element of the AFFTC mission. These activities have supported the changing needs of the AFFTC mission and have not significantly altered the productivity of the environment. Cultural resources management activities are not expected to change this condition. Environmental protection measures for all the physical and natural resources have been included to minimize the potential environmental impacts to identified sensitive resources and to all personnel. Any anticipated environmental impacts are expected to be short term. A long-term positive impact will result in

eliminating obstacles to future projects with a more targeted approach to cultural resources management activities, and by identifying cultural resources for protection.

### 4.8.4 Irreversible and Irretrievable Commitment of Resources

Irreversible commitments of resources entail the consumption of or adverse effect upon resources that cannot be reversed or persists for an extremely long period of time. Irretrievable commitments of resources are those that are consumed, or affect resources for a short period of time, that would be restored over time. Irreversible and irretrievable commitment of resources would result from any of the proposed project alternatives.

There are three irreversible and irretrievable commitments of resources that would result from the various alternatives. These would include the materials used during project activities, the fuel consumed by project vehicles, and the funds allocated for project activities.

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## 6.0 LIST OF PREPARERS AND REVIEWERS

The following people were responsible for the preparation or review of the *Environmental Assessment for the Integrated Cultural Resources Management Plan, Edwards Air Force Base, California.*

**Preparers**

Linda Anton – Interdisciplinary Team Member
Biologist, JT3/CH2M HILL
B.S., 2001, Biology, California State University, Bakersfield.
Years of Experience: 2

Michelle Bare – Co-Project Manager
Environmental Analyst, JT3/CH2M HILL
Years of Experience: 9

Jacquelyn Hull - Interdisciplinary Team Member
Technical Editor, JT3
Years of Experience: 5

Kelly A. Lark – Co-Project Manager
Environmental Analyst/Archaeologist, JT3/CH2M HILL
B.S., 1986, Anthropology, Towson State University
Years of Experience: 12

Doryann Papotta – Interdisciplinary Team Member
Technical Editor, JT3
Years of Experience: 14

**Reviewers**

Gerald Callahan
USAF, Chief, Environmental Conservation Branch (95 ABW/CEVX)

Richard Norwood
USAF, Base Historic Preservation Officer (BHPO) (95 ABW/CEVXC)

Christopher Rush
USAF, Conservation Branch Chief (95 ABW/CEVXC)

Robert R. Sands, Ph.D.
Environmental Department Manager, JT3/CH2M HILL

Robert M. Shirley
USAF, Chief, Environmental Quality Branch (95 ABW/CEVC)

Susan K. Theiss
Conservation Section Manager, JT3/CH2M HILL

Stephen E. Watts, Ph.D.
Conservation Team Lead, (95 ABW/CEVXC)

Robert Wood
USAF, Chief, Environmental Management Division (95 ABW/CEV)

AFFTC NEPA Assessment Review Group (ARG) Members – AFFTC/JA, 95 ABW/PA, AFFTC/XP, 95 ABW/CEV, AFFTC/IT, 412TW/RMF, 95 ABW/CECV, 95 AMDS/SGPB, AFFTC/SEG

95 ABW (CEVC, CEVR, CEVX)

## 7.0 LIST OF AGENCIES AND ORGANIZATIONS TO WHOM COPIES OF THE ENVIRONMENTAL ASSESSMENT ARE SENT

**Federal Agencies**

Advisory Council of Historic Preservation, Lakewood, Colorado

AFFTC Technical Library, Edwards AFB, California

Edwards Base Library, Edwards AFB, California

Headquarters Air Force Major Command, Wright Patterson AFB, Ohio

**State Agencies and Local Agencies**

California Native American Heritage Commission, Sacramento, California

Kern County Library, Boron Branch, Boron, California

Kern County Library, California City Branch, California City, California

Kern County Library, Wanda Kirk Branch, Rosamond, California

Los Angeles County Library, Lancaster Branch, Lancaster, California

Office of Historic Preservation, California Department of Parks and Recreation, Sacramento, California

Palmdale City Library, Palmdale, California

**Interested Parties**

Mary Ann Andreas, Morongo Band of Mission Indians

Bernadette Brierty, San Manuel Band of Mission Indians

David Chavez

Charles Cook

Betty L. Cornelius, Colorado River Indian Tribes

Delia Dominguez, Kitanemuk and Yowlumne Tejon Indians

Grjrle Dunlap, Chemehuevi Tribal Council

Daniel Eddy, Jr., Colorado River Indian Tribes

Beverly Folks

Pauline Gallegos

Ernie Garcia, Tejon Indian Tribe

Christine Hernandez

Lucille Hicks

Kawaiisu Tribal Council

Matthew Leivas, Sr., Chemehuevi Tribal Council

Lynne R. LeRoy, San Manuel Band of Mission Indians

Maurice Lyons, Morongo Band of Mission Indians

Deron Marquez, San Manuel Band of Mission Indians

Kathy Morgan, Tejon Indian Tribe

George Murillo, San Manuel Band of Mission Indians

Clyde Lee Robinson

David Laughinghorse Robinson, Kawaiisu Tribe

Alan Salazar

San Manuel Band of Mission Indians, Highland, California

Ernest Siva, Morongo Band of Mission Indians

Charles Smith

Tehachapi Indian Tribe

John Valenzuela, San Fernando Band of Mission Indians

Fay Van Horn

Kathy Van Meter, Tejon Indian Tribe

Paul Varela

Goldie Weaver, Serrano Band of Indians

Ron Wermuth, Kern Valley Indian Community

Anwa Wilanii

Harold Williams

Britt W. Wilson, Morongo Band of Mission Indians

*FINAL*

# *APPENDICES*

***July 2005***

# APPENDIX A

# AIR EMISSION CALCULATIONS

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| MOBILE SOURCES | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Equipment or Vehicle Type** | **Rate of Emissions** | **Number of Equipment/Vehicles** | **Number of Miles** | **Number of Days** | **Number of Hours** | **NOx Emission Factor** | **VOC Emission Factor** | **PM10 Emission Factor** | **Total NOx Emissions** | **Total VOC Emissions** | **Total PM10 Emissions** |
| LDGV | lb/mile | 0 | 0 | 0 | N/A | 0.007 | 0.021 | 0.0003 | 0.0000 | 0.0000 | 0.0000 |
| LDGT | lb/mile | 6 | 101,376 | 240 | N/A | 0.003 | 0.007 | 0.0002 | 0.1521 | 0.3548 | 0.0101 |
| LDDT | lb/mile | 0 | 0 | 0 | N/A | 0.004 | 0.002 | 0.001 | 0.0000 | 0.0000 | 0.0000 |
| HDGT | lb/mile | 0 | 0 | 0 | N/A | 0.010 | 0.006 | 0.0003 | 0.0000 | 0.0000 | 0.0000 |
| HDDT | lb/mile | 0 | 0 | 0 | N/A | 0.045 | 0.014 | 0.006 | 0.0000 | 0.0000 | 0.0000 |
| Track Tractor | lb/hour | 0 | N/A | 0 | 0 | 1.26 | 0.121 | 0.112 | 0.0000 | 0.0000 | 0.0000 |
| Wheeled Tractor | lb/hour | 0 | N/A | 0 | 0 | 1.269 | 0.188 | 0.136 | 0.0000 | 0.0000 | 0.0000 |
| Track Loader | lb/hour | 0 | N/A | 0 | 0 | 0.827 | 0.098 | 0.058 | 0.0000 | 0.0000 | 0.0000 |
| Wheeled Loader | lb/hour | 0 | N/A | 0 | 0 | 1.89 | 0.25 | 0.172 | 0.0000 | 0.0000 | 0.0000 |
| Misc. Wheeled | lb/hour | 0 | N/A | 0 | 0 | 1.691 | 0.152 | 0.139 | 0.0000 | 0.0000 | 0.0000 |
| Gas Forklift | lb/hour | 0 | N/A | 0 | 0 | 0.412 | 0.560 | 11.7 | 0.0000 | 0.0000 | 0.0000 |
| Diesel Forklift | lb/hour | 0 | N/A | 0 | 0 | 1.691 | 0.152 | 0.139 | 0.0000 | 0.0000 | 0.0000 |
| Shipping Truck | lb/hour | 0 | N/A | 0 | 0 | 1.691 | 0.152 | 0.139 | 0.0000 | 0.0000 | 0.0000 |
| Roller | lb/hour | 0 | N/A | 0 | 0 | 1.691 | 0.2 | 0.139 | 0.0000 | 0.0000 | 0.0000 |
| Backhoe Loader | lb/hour | 0 | N/A | 0 | 0 | 1.89 | 0.25 | 0.172 | 0.0000 | 0.0000 | 0.0000 |
| Excavator | lb/hour | 0 | N/A | 0 | 0 | 1.691 | 0.152 | 0.139 | 0.0000 | 0.0000 | 0.0000 |
| Bulldozer (tracked) | lb/hour | 0 | N/A | 0 | 0 | 24.5 | 2.9 | 12.9 | 0.0000 | 0.0000 | 0.0000 |
| Haul/Concrete Truck | lb/hour | 0 | N/A | 0 | 0 | 4.166 | 0.192 | 0.256 | 0.0000 | 0.0000 | 0.0000 |
| Soil Compactor | lb/hour | 0 | N/A | 0 | 0 | 1.691 | 0.2 | 0.139 | 0.0000 | 0.0000 | 0.0000 |
| Motor Grader | lb/hour | 0 | N/A | 0 | 0 | 0.713 | 0.04 | 0.061 | 0.0000 | 0.0000 | 0.0000 |
| Frontend Loader | lb/hour | 0 | N/A | 0 | 0 | 1.89 | 0.25 | 0.172 | 0.0000 | 0.0000 | 0.0000 |
| | | | | | | | | **TOTAL:** | 0.1521 | 0.3548 | 0.0101 |

| STATIONARY SOURCES | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Equipment or Vehicle Type** | **Rate of Emissions** | **Number of Equipment/Vehicles** | **Number of Miles** | **Number of Days** | **Number of Hours** | **NOx Emission Factor** | **VOC Emission Factor** | **PM10 Emission Factor** | **Total NOx Emissions** | **Total VOC Emissions** | **Total PM10 Emissions** |
| Gas Engine | lb/hour | 0 | N/A | N/A | 0 | 0.017 | 0.052 | 0.001 | 0.0000 | 0.0000 | 0.0000 |
| Diesel Engine | lb/hour | 0 | N/A | N/A | 0 | 2.010 | 0.160 | 0.143 | 0.0000 | 0.0000 | 0.0000 |
| Natural Gas Engine | lb/hour | 0 | N/A | N/A | 0 | 0.017 | 0.052 | 0.001 | 0.0000 | 0.0000 | 0.0000 |
| Gasoline Welder | lb/hour | 0 | N/A | N/A | 0 | 0.017 | 0.052 | 0.001 | 0.0000 | 0.0000 | 0.0000 |
| Diesel Welder | lb/hour | 0 | N/A | N/A | 0 | 0.017 | 0.052 | 0.001 | 0.0000 | 0.0000 | 0.0000 |

Notes:
1. LDGV = light-duty gasoline vehicle
2. LDGT = light-duty gasoline truck
3. LDDT = light-duty diesel truck
4. HDGT = heavy-duty gasoline truck
5. HDDT = heavy-duty diesel truck
6. NOx = oxides of nitrogen
7. VOC = volatile organic compounds
8. PM10 = particulate matter equal to or below 10 microns
9. N/A = not applicable
10. lb = pound

| Total Emissions From Criteria Pollutants (tons/year) | Vehicle/Equipment Type | | Aircraft | Total Direct Emissions |
|---|---|---|---|---|
| | Mobile Sources | Stationary Sources | | |
| Direct NOx Emissions | 0.1521 | 0.0000 | 0 | **0.1521** |
| Direct VOC Emissions | 0.3548 | 0.0000 | 0 | **0.3548** |
| Direct PM10 Emissions | 0.0101 | 0.0000 | N/A | **0.0101** |

| Total Emissions From Criteria Pollutants (tons/year) | Vehicle/Equipment Type | | Aircraft | Total Indirect Emissions |
|---|---|---|---|---|
| | Mobile Sources | Stationary Sources | | |
| Indirect NOx Emissions | 0.0000 | 0.0000 | 0 | **0.0000** |
| Indirect VOC Emissions | 0.0000 | 0.0000 | 0 | **0.0000** |
| Indirect PM10 Emissions | 0.0000 | 0.0000 | N/A | **0.0000** |

Notes:
1. NOx = oxides of nitrogen
2. VOC = volatile organic compounds
3. PM10 = particulate matter equal to or below 10 microns
4. N/A = not applicable

**Assumptions:**
Construction personnel would be traveling 70.4 miles (roundtrip).

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**DEPARTMENT OF THE AIR FORCE**
**HEADQUARTERS 95TH AIR BASE WING (AFMC)**
**EDWARDS AIR FORCE BASE, CALIFORNIA**

**MEMORANDUM FOR 95 ABW/CC**

FROM: 95 ABW/CEVC
5 East Popson Avenue, Building 2650A
Edwards AFB CA 93524-8060

SUBJECT: *Clean Air Act* Conformity Statement for Control No. 03-0542*, Implementation of an Integrated Cultural Resources Management Plan*

1. The following finding is made on the need for a conformity statement under the *Clean Air Act* with respect to the Proposed Action.

a. The Proposed Action is located in the following air quality management districts: Kern County Air Pollution Control District (KCAPCD), Mojave Desert Air Quality Management District (MDAQMD), and Antelope Valley Air Quality Management District (AVAQMD).

b. Under regulations promulgated pursuant to the *Clean Air Act*, title 42 United States Code (USC) part 7506(c), Edwards Air Force Base is located in a *Serious* nonattainment area for ozone. The *de minimis* level set for this area for emissions of ozone precursor pollutants (volatile organic compounds [VOCs] or oxides of nitrogen [$NO_x$]), in accordance with title 40 Code of Federal Regulation (CFR) part 51.853/93.153(b)(1) and KCAPCD Rule 210.7, is up to 50 tons per pollutant (VOCs or NOx) per year per action.

c. Under regulations promulgated pursuant to the *Clean Air Act*, 42 USC 7506(c), the Proposed Action portion of the project area regulated by the MDAQMD and AVAQMD is located in a nonattainment area for ozone. These areas are rated as *Severe 17* under the federal *Clean Air Act*. As such, the *de minimis* level set for ozone emissions, in accordance with 40 CFR 51.853/93.153(b)(1), MDAQMD Rule 2002, and AVAQMD Regulation XIII, is up to 25 tons per ozone precursor pollutant (VOC or $NO_x$) per year per action.

d. Under the federal *Clean Air Act*, the Proposed Action portion of the project area regulated by the MDAQMD is located in a *Moderate* nonattainment area for particulate matter less than or equal to 10 microns (PM10). As such, the *de minimis* level set for PM10 emissions is up to 100 tons per year per action.

e. It has been determined that the relevant air emissions for this action are 0.15 tons of $NO_x$, 0.35 tons of VOC, and 0.01 tons of PM10 per year. The direct and indirect emissions from this action, when totaled, are less than the *de minimis* amounts specified in title 40 CFR 51.853/93.153(b)(1); therefore, a conformity determination is not required.

2. Should you have any questions with respect to this finding, please direct them to James Specht at (661) 277-1439.

ROBERT M. SHIRLEY, Chief
Environmental Quality Branch