

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

1.0 INTRODUCTION

The Edwards Air Force Base (AFB) Civil Engineer Group (412 CEG) proposes the management of the natural resources at Edwards AFB through the development and implementation of an Integrated Natural Resources Management Plan (INRMP). An INRMP is required by the *Sikes Act* for Department of Defense Installations with significant natural resources. The INRMP is required to be based on ecosystem management principles and use adaptive management techniques. It identifies management objectives and goals; specific management methods; schedules of activities and projects; responsibilities of site planners and decision makers; monitoring systems; protection and enforcement systems; land use potentials and restrictions; and resource requirements including professional and technical manpower.

This Environmental Assessment (EA) documents the analysis of the actions required to manage the natural resources on Edwards AFB. This EA evaluates the management actions that will be used to develop and implement the INRMP. This EA fulfills the requirements for compliance with the National Environmental Policy Act (NEPA), Title 40 of the Code of Federal Regulations Parts 1500-1508 and Air Force Instruction 32-7061, which are the applicable implementing regulations for NEPA.

This EA details the analysis of the activities associated with the management of natural resources and supports a Finding of No Significant Impact (FONSI) for all of the alternatives considered. The most common impact identified was the temporary and minor ground disturbances associated with natural resources management activities (e.g. exotic species removal, habitat restoration projects, prescribed burns and erosion control projects) which are specifically designed to enhance the natural environment.

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

Based on the level of funding, any of the alternatives in the EA may be selected in a given year. Under Alternative A (No Action Alternative), an INRMP would be developed and implemented to only comply with the applicable Federal, State and Local laws and regulations via implementing natural resource projects and associated action; the management of natural resources would continue at current levels. Under Alternative B (High Level Management Action), the INRMP would include high priority management actions specifically targeted to a particular resource. Specific groups of plants and animals would be targeted to potentially increase current populations; therefore, the High Level Management approach is characterized by more individual projects and more ground disturbance actions. Under Alternative C, minimal management actions would be implemented to avoid habitat degradation that would result in a mission impact. Very few natural resource projects would be implemented within a given year. Extremely minimal ground disturbance would occur such as installing signs and tortoise fence, constructing bat houses, controlling soil erosion and restoring hydrological processes at Piute Ponds.

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14. ABSTRACT Pursuant to the National Environmental Policy Act of 1969, this Environmental Assessment (EA) documents the impacts of how Edwards AFB plans to implement the 2014 Edwards Air Force Base Integrated Natural Resources Management Plan. This EA includes impacts previously addressed in the Environmental Assessment for the Integrated Natural Resources Management Plan for Edwards Air Force Base, California (2001) and additional impacts not previously addressed in the 2001 EA. This EA evaluates the same alternatives previously evaluated in the 2001 EA. The proposed project involves management of the natural resources on Edwards AFB through the implementation of a targeted Integrated Natural Resources Management Plan (INRMP).			
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3.0 ENVIRONMENTAL EFFECTS

Components of the natural and manmade environment that were analyzed for potentially significant impacts include: Land Use, Noise, Air Quality, Safety and Occupational Health, Hazardous and Solid Waste, Biological Resources, Cultural Resources, Soils, Socioeconomics and Environmental Justice. No potentially significant impacts were identified under the alternatives considered.

Projects involving the use of heavy equipment or project locations near the flightline have the potential to expose personnel to aircraft noise levels which could impair the hearing of workers. All workers would use appropriate hearing protection and comply with applicable Federal and State regulations.

Natural resource management actions that use fossil fuel powered vehicles and equipment, include prescribed burns, and/or include pesticide use, would impact air quality by increasing the amount of emissions discharged into the air. Emissions generated under Alternative B (High Level Management Action) were determined to be *de minimis* due to the small number of vehicles and equipment involved, minimal use of pesticides in accordance with the approved policy and that these emissions would be spread over a period of a year. All prescribed burns shall be coordinated with the Fire Department and any prescribed burns of 10 acres or more will require a burn plan and permit. Compliance with all minimization measures in the EA would help reduce air quality impacts to less than significant levels.

The presence of unexploded ordnance in areas where natural resource projects involve ground disturbance has the potential to impact safety and occupational health of workers. Required range safety briefings and procedures on the potential discovery of unexploded ordnance would eliminate any adverse safety impacts to project personnel. Exposure to pesticides and herbicides has the potential to affect health and safety of applicators; however, use of pesticides and herbicides shall only be performed by or under the supervision of a DoD-certified pesticide applicator and in accordance with the Federal Insecticide, Fungicide and Rodenticide Act.

Ground disturbing activities may adversely affect cultural resources. All ground disturbing activities shall be coordinated with the Base Historic Preservation Officer (BHPO) and would not be performed in sites with known cultural resources. Cultural resource surveys would be conducted in areas not previously surveyed prior to any project onset. When cultural resource materials are uncovered during ground disturbing activities, work will cease immediately in the area of discovery and the BHPO will be notified. Other ground disturbance actions would be extremely limited to planting vegetation, installing tortoise fence and tortoise awareness signs, installing wildlife guzzlers, maintenance of dikes at Piute Ponds and removing dead and decaying vegetation and sediment buildup from the Piute Ponds Complex to increase depths of various ponds.

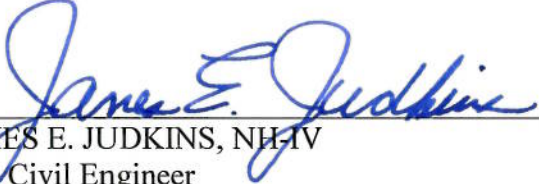
For the most part, all INRMP actions greatly benefit the ecosystem through education and tours, increasing quality of life via the hunting and fishing program, restoring habitat, monitoring, tracking, maintaining wildlife populations and their habitat, protecting listed and

sensitive species, removing invasive/exotic plant and animals, creating habitat for migratory birds and other species, providing available water sources for game birds and migratory birds, establishing conservation areas and supporting the recovery of the desert tortoise.

4.0 FINDINGS

A FONSI for the alternatives is made based on the absence of potentially significant adverse impacts to the environment. Background information that supports the research and development of this FONSI and EA is on file at Edwards AFB and can be obtained by contacting the following:

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**ENVIRONMENTAL ASSESSMENT
FOR THE INTEGRATED NATURAL
RESOURCES MANAGEMENT
PLAN FOR EDWARDS AIR FORCE
BASE, CALIFORNIA**

Final

February 2015

Project File: Environmental Assessment for the Integrated Natural Resources Management Plan
for Edwards Air Force Base, California
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COVER SHEET

ENVIRONMENTAL ASSESSMENT FOR THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN FOR EDWARDS AIR FORCE BASE, CA

- Lead Agency: U.S. Air Force
- Cooperating Agency: None
- Proposed Action: Environmental Assessment for the Integrated Natural Resources Management Plan for Edwards Air Force Base (AFB), California
- Inquiries on this document should be directed to the 412th Civil Engineer Group, Environmental Management Division, Assets Branch (412 CEG/CEVA), Attn: Thomas Rademacher, 12 Laboratory Road, Bldg. 4231, Edwards AFB CA 93524, (661) 277-1402, e-mail Thomas.Rademacher.2@us.af.mil
- Designation: Final Environmental Assessment (EA)
- Abstract: Pursuant to the *National Environmental Policy Act of 1969*, this Environmental Assessment (EA) documents the impacts of how Edwards AFB plans to implement the *2014 Edwards Air Force Base Integrated Natural Resources Management Plan*. This EA includes impacts previously addressed in the *Environmental Assessment for the Integrated Natural Resources Management Plan for Edwards Air Force Base, California (2001)* and additional impacts not previously addressed in the 2001 EA. This EA evaluates the same alternatives previously evaluated in the 2001 EA. The proposed project involves management of the natural resources on Edwards AFB through the implementation of a targeted Integrated Natural Resources Management Plan (INRMP). Adherence to all applicable Federal, State, and local laws and regulations, and Air Force Instructions would ensure no significant environmental impacts would occur as a result of this project.

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LIST OF ABBREVIATIONS AND ACRONYMS

412th CEG	412th Civil Engineer Group
412th CEV	Environmental Management Division
412th CEG/CEVA	Environmental Management Division, Assets Branch
412th TW	412th Test Wing
412 TW/LGQ	Quality Assurance Inspection Branch
AB	Assembly Bill
ACHP	Advisory Council on Historic Preservation
ADCA	Animal Damage Control Act
AF	Air Force
AFB	Air Force Base
AFTC	Air Force Test Center
AFFTC	Air Force Flight Test Center
AFFTCI	Air Force Flight Test Center Instruction
AFI	Air Force Instruction
AFJMAN	Air Force Joint Manual
AFOOSH	Air Force Occupational Safety and Health
AFPD	Air Force Policy Directive
AFRL	Air Force Research Laboratory
AGE	Aerospace Ground Equipment
ARPA	Archaeological Resources Protection Act
ATC	authority to construct
AVAPCD	Antelope Valley Air Pollution Control District
BASH	Bird Aircraft Strike Hazard
BEPA	Bald Eagle Protection Act
BHPO	Base Historic Preservation Officer
BLM	Bureau of Land Management
BMP	Best Management Practice
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
Cal-OSHA	California Occupational Safety and Health Administration
CAR	Combat Arms Range
CARB	California Air Resources Board
CATEX	categorical exclusion
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CNPS	California Native Plant Society
CO	carbon monoxide
dB	decibel

dba	decibel, A-weighted
DNL	day-night average sound level
DoD	Department of Defense
DoDD	Department of Defense Directive
DoDI	Department of Defense Instruction
DOT	Department of Transportation
DRU	Direct Reporting Unit
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EPCRA	Emergency Planning and Community Right-to-Know Act
ERP	Environmental Restoration Program
ESA	Endangered Species Act
FFCA	Federal Facility Compliance Act
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FOA	Field Operating Agencies
FOD	foreign object damage
FONSI	Finding of No Significant Impact
FWCA	Fish and Wildlife Coordination Act
GIS	Geographic Information System
HAP	Hazardous Air Pollutant
HDSC	Hazardous Materials Distribution Support Centers
HMTA	Hazardous Materials Transportation Act
HWMP	Hazardous Waste Management Plan
INRMP	Integrated Natural Resources Management Plan
IAW	in accordance with
IPM	Integrated Pest Management
IRP	Installation Restoration Program
KCAPCD	Kern County Air Pollution Control District
MACT	maximum achievable control technology
MBTA	Migratory Bird Treaty Act
MDAQMD	Mojave Desert Air Quality Management District
MFH	Military Family Housing
MOU	Memorandum of Understanding
MSL	mean sea level
MWR	Morale, Welfare, and Recreation
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act
NESHAP	National Emission Standard for Hazardous Air Pollutants
NGR	National Guard Regulation
NHPA	National Historic Preservation Act

NO _x	oxides of nitrogen
NPS	National Park Service
NRCS	Natural Resource Conservation Service
O ₃	ozone
ORV	off-road vehicle
OSHA	Occupational Safety and Health Administration
PIRA	Precision Impact Range Area
PL	Public Law
PM10	particulate matter equal to or less than 10 microns
PTO	permit to operate
RCRA	Resource Conservation and Recovery Act
SB	Senate Bill
SCH	State Clearing House
SCS	Soil Conservation Service
SEA	Significant Ecological Area
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO _x	sulfur oxides
TIM	Technical Information Memorandum
TSCA	Toxic Spills Control Act
USACOE	United States Army Corps of Engineers
USAF	United States Air Force
USC	United States Code
USDA	United States Department of Agriculture
US EPA	United State Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USFS	United States Forest Service
USGS	United States Geological Survey
UXO	unexploded ordnance
VOC	volatile organic compounds

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1.0 INTRODUCTION

1.1 Purpose and Need

This environment assessment (EA) is a new document based on the 2001 *Environmental Assessment for the Integrated Natural Resources Management Plan for Edwards Air Force Base, California* (2001 EA) and implementation of the target alternative for management of natural resources on Edwards AFB. This EA documents any new impacts from revisions and project additions in the 2014 Edwards AFB Integrated Natural Resources Management Plan (2014).

The Commander of Edwards Air Force Base (AFB), in coordination with the United States Fish and Wildlife Service (USFWS) and the California Department of Fish and Wildlife (CDFW), proposes to manage the natural resources on Edwards AFB by developing and implementing an Integrated Natural Resources Management Plan (INRMP). The INRMP will comply with environmental laws, regulations, and policies, including the *Sikes Act* (16 United States Code [USC] 670a et seq.); Department of Defense Instruction (DoDI) 4715.03, *Natural Resources Conservation Program*; and Air Force Instruction (AFI) 32-7064, *Integrated Natural Resources Management*. The INRMP will support the military mission, conserve and protect the Base's natural resources; and build upon relationships established with Federal, State, and local agencies, nonprofit organizations, and the general public. The INRMP will also be consistent with other installation plans, specifically the *General Plan Edwards Air Force Base California* (412 TW/CEAO, 2013) and or future Installation Development Plans.

The INRMP will emphasize a continued ecosystem management approach by Edwards AFB in concert with the Air Force mission. One goal of an ecosystem management approach is to protect the properties and functions of natural ecosystems. Since these ecosystems extend beyond the installation's boundaries, the Air Force's natural resources management will also include coordination and partnerships with agencies that have natural resources in the surrounding areas, achieving a balance between resource users, developing mechanisms to establish and maintain partnerships, and an enhanced environmental education program. The proposed action has the following characteristics and may be applicable to any of the alternatives:

- Ecological Approach – The INRMP will continue to primarily focus on management of ecosystems and secondarily on protection of individual species.
- Partnerships – The INRMP will document partnerships to achieve shared goals. Ecosystems extend across political boundaries, making the need for cooperation, coordination, and partnerships essential for their management.
- Participation – The INRMP will include public involvement and communication, and will incorporate the public's needs and desires into management decisions.
- Information – The INRMP will use the best available scientific and field-tested information available in the decision-making process and select the most appropriate technologies for management of natural resources.

- Adaptive Management – Resource managers will incrementally implement adaptive management techniques as they become known through the dynamic process of analyzing and applying the best available commercial and scientific data.

The major issues related to natural resource management activities identified for Edwards AFB include habitat restoration, cultural sites, soils, rare plants, plant communities, wildlife, and habitat disturbance. These issues were identified because they are associated with management of natural resources on the Base.

1.2 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 307,517 acres or 470 square miles. Portions of the Base lie within Kern, Los Angeles, and San Bernardino counties (Figure 1-1).

1.3 Issues and Concerns

1.3.1 Issues and Concerns

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

- a) Land Use – Ecosystem management consistency with both mission operations, and local and regional plans and development with respect to acquiring conservation easements off base. Periodic intermittent flooding on Rosamond Dry Lake would occur to repair the lakebed surface to support mission operations.
- b) Air Quality – Natural resource management activities would cause short-term degradation in air quality. Construction equipment, construction and personal vehicles, would generate criteria pollutants during habitat restoration, guzzler installation, dredging, prescribed burns, desert tortoise exclusion fence construction, and invasive pest removal activities during implementation of natural resource projects.
- c) Safety and Occupational Health – Construction equipment (e.g., track-hoes and back-hoes) noise levels may affect project personnel. Aircraft noise may affect project personnel on the flightline. Personnel may be exposed to toxic substances during application of pest and weed control chemicals. Project personnel may increase the risk for Bird Air Strike Hazards (BASH) during surveys of migratory birds within the flightline areas and during implementation of migratory bird controls in hangars. Personnel may encounter unexploded ammunition during projects involving habitat restoration, road closures, biological surveys and monitoring, and installation of wildlife guzzlers and desert tortoise exclusion fence.
- d) Hazardous Materials, Solid Waste, and Green Waste – Herbicides used to control invasive plants (Sahara mustard and Tamarisk) in remote areas may spread toxic chemicals to adjacent plants resulting in ingestion by animals or exposure to their skin. Pesticides used to control pest animals (e.g., California ground squirrels) may be toxic to other animals that prey on ground squirrels. Empty containers of both herbicides and

pesticides are considered hazardous waste. Disposal of vegetation from restoration projects and vegetation and sludge from Branch Park pond and Piute Ponds Complex would occur.

- e) **Biological Resources** – Ground-disturbing activities associated with natural resource management practices include road closures, installing wildlife guzzlers and desert tortoise exclusion fence, dredging and vegetation removal at Piute Ponds and Branch Park pond, and construction vehicles/equipment have the potential to disturb and/or harm wildlife (especially the desert tortoise listed as a federal and state threatened species and Mohave ground squirrel listed as a state threatened species. Habitat restoration may increase invasive plants or reintroduce exotic and invasive species. Dikes and weirs would be replaced and maintained at Piute Ponds to manage habitat for migratory birds. Creation of bat habitat may be required should bat maternity roosts be lost.
- f) **Cultural Resources** – Ground-disturbing activities associated with natural resource management practices have the potential to disturb cultural resource sites.
- g) **Soils** – Ground-disturbing activities during habitat restoration and installation of guzzlers have the potential to create soil erosion resulting in loss of topsoil.
- h) **Water Resources** – Potable water would be used to fill wildlife guzzlers and storage tanks for restoration activities during drought periods.
- i) **Socioeconomic** – Generation of incremental revenue into the local economy.
- j) **Recreation** – Stocking upland game birds (e.g., chukar), maintaining wildlife guzzlers to provide a water source for upland game birds, construction of hunting blinds, dredging and removing vegetation from Branch Park Pond and Piute Ponds, water management of Piute Ponds, and restocking fish in Branch Park pond provide recreational opportunities.

1.3.2 Issues and Concerns Eliminated From Detailed Study

The following issues and concerns were initially considered, but subsequently eliminated from further consideration in this EA because these resources are not affected:

- a. **Airspace** – No natural resource management activities are expected to utilize airspace.
- b. **Infrastructure** – No new infrastructure development is anticipated.
- c. **Public/Emergency Services** – No additional services would be needed.
- d. **Environmental Justice and Protection of Children** – No potential to affect due to remoteness of the base, limited access, adherence to spill prevention plan guidelines, and use of certified DoD applicators for herbicides and pesticides.

1.4 Regulatory Requirements, Permits, and Approvals

1.4.1 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 (Sections 1500.1(b) et seq.). This document is intended to fulfill the requirements for compliance with Title 40 Code of Federal Regulations (CFR) Parts 1500-1508 and Air Force Instruction (AFI) 32-7061, *The Environmental Impact Analysis Process*. A list of regulatory requirements and guidance can be found in Appendix A.

1.4.2 Permits and Approvals

The proposed project will require permits and/or approvals from other Federal, State, and/or local agencies, or various Base offices depending upon the extent of the work proposed, type of equipment used, etc. 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 the Environmental Assets Branch of Environmental Management. However, as permitting requirements change, others may be required. The following permits would be required:

- A dig permit (Air Force Test Center [AFTC] IMT 5926) is required for habitat restoration, dredging in Piute Ponds, exotic/invasive plant removal by construction equipment, and installation of wildlife exclusion fence and guzzlers.
- A Memorandum of Understanding is required from the California Department of Fish and Wildlife to conduct surveys for Mohave ground squirrels where live-trapping is a requirement.
- Project personnel require approvals from the U.S. Fish and Wildlife Service (USFWS) to conduct desert tortoise surveys, monitor ground disturbing project activities, and provide education awareness training IAW the terms and conditions of an applicable biological opinion obtained IAW the Federal Endangered Species Act (ESA).
- Reinitiation of Section 7 Consultation on existing Biological Opinions IAW the ESA may be required for future natural resource management activities.
- A USFWS depredation permit is required to disturb nesting migratory birds or “take” (harm, kill) migratory birds.
- A Department of Defense (DoD) Applicator Certification is required to apply pesticides and herbicides on Federal property.
- Formal consultation with the Advisory Council on Historic Preservation (ACHP) and/or the California State Historic Preservation Office (SHPO) pursuant to Section 106 of the *National Historic Preservation Act* (NHPA), as amended (16 USC 470 et seq.) may be required if natural resource management plans to impact cultural resources.

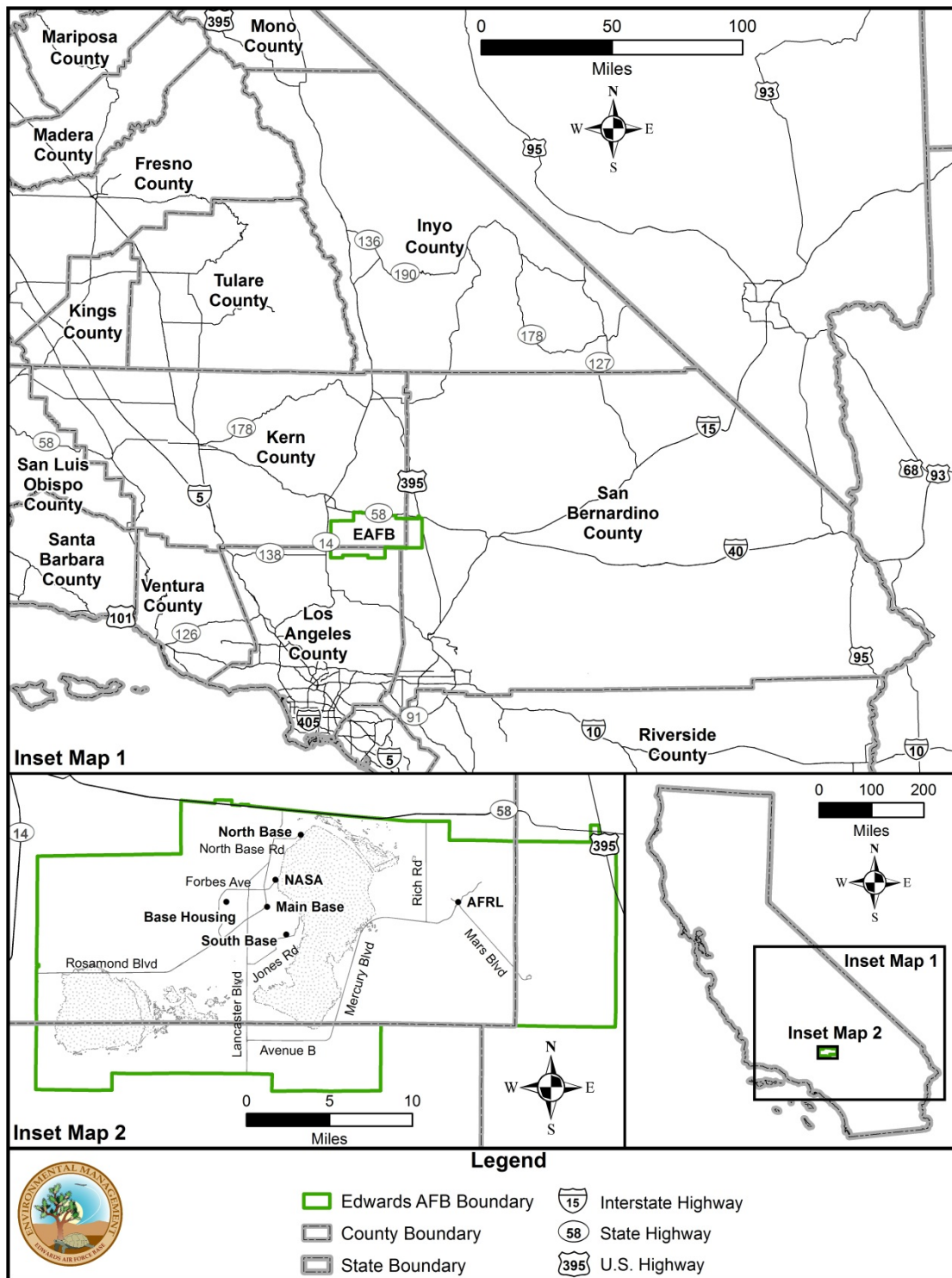


Figure 1-1 General Vicinity Map

1.5 Related Environmental Documents and Future Management Actions

A number of related environmental documents have been prepared and approved that address activities related to the INRMP. These documents contain information used in the preparation of this EA. A listing of these documents and other references can be found in Section 5.

Future management actions documented on an AF Form 813, *Request for Environmental Impact Analysis*, 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 recurring 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 AF Form 813 is submitted. A CATEX could also be prepared for future actions that would result in minor impacts not discussed in this EA, if impacts could be reduced to insignificant levels through adherence to mitigation. 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 actions that are found to result in significant impact to the environment that could not be minimized to a level of insignificance would need to be addressed in an Environmental Impact Statement (EIS).

1.6 Environmental Assessment Public Notification Process

The federal and state resource agencies were notified on the development and implementation of a revised and updated INRMP in 2014. The agencies were involved in the early development of the management sections and goals and objectives.

This EA and the current INRMP was published and made available for a 30-day public review period beginning 1 December 2014 through 1 January 2015. Edwards AFB accepted comments through 15 January 2015.

All comments were addressed and/or incorporated into this EA. The comments and responses to comments are found in Appendix D.

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

Ecosystem management has been the standard since the Sikes Act was revised in 1997. The Department of the Air Force is required by the *Sikes Act* and DoDI 4715.03, *Natural Resources Conservation Program*, to use ecosystem management principles on Air Force lands. Ecosystem management is not, however, a single concept with simple rules. There are many discretionary management techniques and practices within the realm of ecosystem management. For example, the U.S. Forest Service (USFS), Bureau of Land Management (BLM), and National Park Service (NPS) also have an ecosystem management requirement, but they approach the specific details in very different manners.

The USFS, BLM, and NPS all use ecosystem management principles to manage their lands. Their different missions direct their specific land management practices and their styles of ecosystem management. The USFS uses a more intense management style involving loss of forest habitat to support their mission requirement to produce timber for the nation. The BLM uses a passive management style, but allows consumptive use of natural resources. The NPS has a “hands off” approach that lets nature take its course with little or no interference from man. The approach or style of management to be used at Edwards AFB is the subject of the analysis in this EA.

The Edwards AFB Installation Commander, in coordination and with approval by the USFWS and the CDFW for those management actions that pertain to their responsibilities IAW various federal and state laws, proposes to manage the natural resources on Edwards AFB by developing and implementing an updated INRMP. This section describes alternative plans to meet this need. Alternative A (No Action Alternative), Alternative B (High Level Management Action), and Alternative C – Low Level Management Action. All of the alternatives depend on effectiveness monitoring and tracking metrics to guide the specific management practices through adaptive management practices.

2.1 Alternative A (No Action Alternative)

Under this alternative, an INRMP would be developed and implemented to only comply with the applicable federal, state, and local laws and regulations via implementing natural resource projects and associated action. This would be accomplished to mimic the current natural carrying capacity of natural resources. This alternative uses management practices to maintain current habitat conditions and diversity of native plant and animal populations. Alternative A would only be funded in order to comply with applicable federal, state, and other required laws and regulations.

Some limited ground disturbance would result under this alternative (i.e., small areas of habitat restoration and herbicide control of exotic and invasive weedy plant species in desert tortoise critical habitat). No disturbance would occur in ephemeral washes.

The management activities listed below will be analyzed for Alternative A.

1. Review proposed projects via the Air Force EIAP.
2. Implement adaptive management techniques.
3. Establish memorandum of agreements and interagency agreements.
4. Manage and close out the Desert Tortoise Head Start Program.

5. Treat/remove/eradicate exotic and invasive plants (including critical habitat).
6. Restore habitat based on ERP activities IAW Biological Opinions.
7. Manage the hunting program.
8. Implement terms and conditions of the desert tortoise biological opinions
9. Implement threatened and endangered species programs and activities
10. Support management and implementation of the BASH plan
11. Conduct migratory bird surveys; monitor project activities

2.2 Alternative B – High Level Management Action

Under Alternative B, the INRMP would include high priority management actions specifically targeted to a particular resource. Specific groups of plants and animals would be targeted to potentially increase current wildlife and native plant populations using commercial techniques as a guideline. This alternative uses management practices to actively enhance the habitat and increase the diversity of native plant and animal populations. No disturbance would occur in ephemeral washes. Under Alternative B, Edwards AFB would still adhere to all applicable federal, state, and other applicable laws and regulations should any of these management actions require such compliance.

This alternative is based on receiving a substantial increase in funding over the funds that would be received under Alternative A. The various individual management plans required by AFI 32-7064 would be developed, revised, and integrated with other plans under this alternative.

The management activities listed below will be analyzed for Alternative B.

1. Review proposed projects via the Air Force EIAP.
2. Conduct species specific and baseline surveys
3. Manage Desert Tortoise Adoption Program
4. Acquire conservation easements
5. Maintain functional watersheds and natural surface flow, conduct maintenance operations at Piute Ponds, flush/move water from pond to pond, divert flow of water to Rosamond Dry Lake, and create and maintain successional cattail/bulrush marsh for waterfowl and shorebirds.
6. Control vegetation by prescribed fires at Branch Park pond and Piute Ponds via manual labor (e.g., pull by hand or remove using hand tools, etc.), and mechanical means (e.g., excavator, bulldozer, backhoe, small bobcat, trackhoe, tractor, and front-end loader, water truck, pick-up truck, etc.).
7. Develop management strategies for sensitive species and proposed listings and candidate species
8. Close non-essential unimproved roads.
9. Implement predator & pest control actions.
10. Manipulate plant succession (e.g., remove non-native vegetation, disk and disrupt soil surface, use native seed mix, and provide supplemental water to restoration sites).
11. Review/evaluate active management strategies, and success of goals, and objectives.
12. Restoration of upland and aquatic habitats.
13. Reintroduce native plant species.
14. Establish conservation areas.

2.3 Alternative C – Low Level Management Action

Under this alternative, minimal management actions would be implemented to ensure the habitat did not degrade and result in a mission impact (unchecked soil erosion, loss of hydrological processes). Very few if any natural resource projects would be implemented within a given year. This alternative represents a very low level of active management and would only provide a minor integrated approach. The Base's wildlife and habitat resources management would be carried out at a relatively low intensity. Edwards AFB would continue to comply with all applicable Federal, State, and local laws and regulations; however, only a few, if any, management actions would be accomplished. Under Alternative C, Edwards AFB would still adhere to all applicable federal, state, and other applicable laws and regulations should any of these management actions require such compliance.

The various management actions required by AFI 32-7064 will be coordinated and integrated with the other plans through the NEPA review process. The various individual management plans required by AFI 32-7064 would be developed, revised, and integrated with other plans under this alternative. No disturbance would occur in ephemeral washes.

The management activities listed below will be analyzed for Alternative C.

1. Review proposed projects via the Air Force EIAP.
2. Partner with private organizations
3. Manage fishing and volunteer program
4. Provide ongoing interpretive education to students
5. Restore natural hydrological processes.
6. Install/maintain desert tortoise signs, exclusion fence, and wildlife guzzlers.
7. Install camera stations and signage for wildlife studies and recreation use.
8. Provide environmental education at Air Shows, Earth Day, etc.
9. Construct suitable alternative bat roosting habitat.
10. Salvage a few abandoned buildings to serve as bat maternity roosts.
11. Assist/update development of component management plans
12. Control soil erosion if determined critical to the mission.
13. Assist with designation of office of primary responsibility for Off Road Vehicle Area (ORVA) 2.

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. Any aspect of an alternative that would exceed the criteria stated below would be considered as a potentially "significant impact" as defined by CEQ. Any of the alternatives may be selected to fulfill a proposed action. The criteria used to select the alternatives discussed in this document are described below.

- a. Technical
 1. Compliance with AFI 32-7064, *Integrated Natural Resources Management*.
 2. Capability to support and integrate with the Air Force mission.
 3. Management goals and objectives should be technically feasible and measurable.

4. Compatible with Base Installation Development Plans.
- b. Environmental
 1. Retain maximum amount of undisturbed area.
 2. Limit permanent habitat disturbance to 1% of total suitable tortoise habitat on base.
 - c. Economic
 1. Implement cost effective management strategies.
 2. Recycle waste for use in natural resource projects.

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, high, and compliance driven level of active ecosystem management. These alternatives were selected to meet the intent of NEPA to cover the full spectrum of feasible alternatives. All alternatives originally considered have been retained within this document. In addition, the suite of proposed goals and objectives described in the INRMP could apply to one or more of the alternatives.

2.6 Comparison Summary of Alternatives

Table 1 provides a descriptive comparison summary of the key features for Alternative A (Targeted Management Action), Alternative B (High Level Management Action), and Alternative C Low Level Management Actions (No Action Alternative).

The natural resource management techniques and activities discussed in this analysis are considered as a group of related actions. Most of the actions are directed specifically at desert tortoise protection and management of other protected species; however, the techniques and management activities also benefit other species and represent an ecosystem approach. Management actions under Alternative A include compliance monitoring to insure no adverse impacts by mission projects occur during implementation of the plan. All of these management activities are integrated through the NEPA review process to ensure consistency with other integrated plans as well as other functional resources (i.e., cultural resource sites, ERP sites). All data collected under all of the alternatives are entered into the Base Geographic Information System (GIS), which serves as one of the primary integration tools.

TABLE 2-1 SUMMARY OF THE POTENTIAL ENVIRONMENTAL IMPACTS

ENVIRONMENTAL ISSUE	ALTERNATIVE A – NO ACTION	ALTERNATIVE B – HIGH LEVEL MANAGEMENT ACTIONS	ALTERNATIVE C – LOW LEVEL MANAGEMENT ACTIONS
LAND USE			
<ul style="list-style-type: none"> • Compatibility with Base General Plan and the Edwards Air Force Base Design Standards 	Plan is integrated. Sensitive resource areas are anticipated to be avoided	Same as Alternative A	Same as Alternative A
<ul style="list-style-type: none"> • Bird Aircraft Safety Hazard (BASH) 	Very small potential for BASH impacts due to BASH plan adherence	No impacts would occur	No impacts
<ul style="list-style-type: none"> • Restoration 	Positive - Restores habitat conditions	Same as Alternative A	Minor benefit-stabilizes land surfaces in small areas
<ul style="list-style-type: none"> • Acquiring conservation lands and easements 	No change	Positive impact - limits encroachment activities on mission operations	No change
<ul style="list-style-type: none"> • Establish conservation areas and agreements 	Shares common goals	Shares common goals	Shares common goals
<ul style="list-style-type: none"> • Burning wetland vegetation 	No change	No change	No change
<ul style="list-style-type: none"> • Road closure 	No change	Positive - Restores habitat continuity	No change
NOISE			
<ul style="list-style-type: none"> • Number and types of noise sensitive receptors 	Limited noise impacts in remote areas	Increased noise impacts in remote areas than Alternative A	Less noise impacts in remote areas than Alternatives A and B
<ul style="list-style-type: none"> • Surveys on the flightline 	Increased noise impacts in the flightline area from surveys	No impacts to project personnel in flightline area	No impacts to project personnel in flightline area
<ul style="list-style-type: none"> • Hearing loss 	Adherence to Air Force and OSHA hearing protection requirements minimizes impacts.	Adherence to Air Force and OSHA hearing protection requirements minimizes impacts.	Adherence to Air Force and OSHA hearing protection requirements minimizes impacts.

TABLE 2-1 SUMMARY OF THE POTENTIAL ENVIRONMENTAL IMPACTS (CONTINUED)

ENVIRONMENTAL ISSUE	ALTERNATIVE A – NO ACTION	ALTERNATIVE B – HIGH LEVEL MANAGEMENT ACTIONS	ALTERNATIVE C – LOW LEVEL MANAGEMENT ACTIONS
<p>AIR QUALITY</p> <ul style="list-style-type: none"> • Tons and types of pollutants generated (vehicle and equipment use, ground disturbances) • Regionally significant • Permit required 	<p>Less than 1 ton of oxides of nitrogen (NO_x) and volatile organic compounds (VOC). Particulate matter less than or equal to 10 microns for (PM10) and for PM2.5 would be significantly less than Alternative B, the high level management action alternative on an annual basis</p> <p>No</p> <p>No</p>	<p>Less than 1 ton of oxides of nitrogen (NO_x), 9 tons for volatile organic compounds (VOC), 15 tons for particulate matter less than or equal to 10 microns (PM10), 6 tons for (PM2.5). All criteria pollutants are at or below the de minimis level on an annual basis</p> <p>No</p> <p>County permit for prescribed burns.</p>	<p>Significantly less than Alternative B, the high level management action alternative on an annual basis based on fewer projects planned for implementation.</p> <p>No</p> <p>No</p>
<p>SAFETY AND OCCUPATIONAL HEALTH</p> <ul style="list-style-type: none"> • Exposure to Unexploded ordnance (UXO) • Exposure to herbicides and pesticides • Heat stress and snakes 	<p>High potential to encounter UXO in remote areas - range safety briefings minimizes impacts to less than significant</p> <p>Minor potential for health effect. All herbicides and pesticides are applied by contractors under the supervision of a Department of Defense (DoD)-certified applicator</p> <p>Safety briefings minimize impacts</p>	<p>Greater potential to encounter UXO than Alternative A. Range safety briefings minimizes impacts to less than significant</p> <p>Minor potential for health effect. All herbicides and pesticides are applied by contractors under the supervision of a Department of Defense (DoD)-certified applicator</p> <p>Safety briefings minimize impacts</p>	<p>Minimal potential due to extremely limited ground disturbance. Range safety briefings minimizes impacts to less than significant</p> <p>No impacts would occur</p> <p>Safety briefings minimize impacts</p>

TABLE 2-1 SUMMARY OF THE POTENTIAL ENVIRONMENTAL IMPACTS (CONTINUED)

ENVIRONMENTAL ISSUE	ALTERNATIVE A – NO ACTION	ALTERNATIVE B – HIGH LEVEL MANAGEMENT ACTION	ALTERNATIVE C – LOW LEVEL MANAGEMENT ACTION
<p>HAZARDOUS MATERIALS, SOLID AND GREEN WASTE</p> <ul style="list-style-type: none"> • Type and amount of hazardous materials used • Generation of hazardous waste <ul style="list-style-type: none"> • Handling requirements • Green Waste disposal • Solid Waste generated/disposal 	<p>Small quantities of herbicides and pesticides less than 25 gallons/year</p> <p>No hazardous wastes are expected to be generated</p> <p>Herbicides/pesticides are applied by a DoD-certified applicator</p> <p>No impacts would occur.</p> <p>None would be generated.</p>	<p>Small quantities of herbicides and pesticides less than 100 gallons/year</p> <p>Same as Alternative A</p> <p>Same as Alternative A</p> <p>Wetland vegetation stockpiled on site</p> <p>Concrete recycled form construction activities would be used on Piute Ponds dikes.</p>	<p>No impacts would occur</p> <p>Same as Alternative A</p> <p>No impacts would occur</p> <p>No impacts would occur</p> <p>None would be generated.</p>
<p>BIOLOGICAL RESOURCES</p> <ul style="list-style-type: none"> • Habitat restoration (includes reintroduction of native plants, road closures, wetland plant removal) • Install tortoise exclusion fence and wildlife guzzlers • Invasive plant control • Desert Tortoise habitat loss acres 1991 – 2013:1,326 for suitable habitat; 7.8 for critical habitat. 	<p>Positive benefits - Habitat diversity and habitat continuity would increase and be verified by monitoring and tracking successional growth.</p> <p>No impacts are expected.</p> <p>Increases habitat diversity, reduces competition with native plants.</p> <p>USFWS 2014 Biological Opinion: allows 15,000 acres of tortoise habitat and 5,000 acres of critical habitat loss.</p>	<p>Habitat diversity and habitat continuity would be greater than Alternative A because more projects would be accomplished</p> <p>No impacts are expected.</p> <p>Same as Alternative A but to a larger degree due to increased projects.</p> <p>Same as Alternative A.</p>	<p>Habitat diversity and habitat continuity would be a benefit but less than Alternatives A and B due to a limited number of proposed projects.</p> <p>Minimal ground disturbance.</p> <p>No impacts are expected.</p> <p>Same as Alternative A.</p>

TABLE 2-1 SUMMARY OF THE POTENTIAL ENVIRONMENTAL IMPACTS (CONTINUED)

ENVIRONMENTAL ISSUE	ALTERNATIVE A – NO ACTION	ALTERNATIVE B – HIGH LEVEL MANAGEMENT ACTION	ALTERNATIVE C – LOW LEVEL MANAGEMENT ACTION
<p>BIOLOGICAL RESOURCES</p> <ul style="list-style-type: none"> • Pest control • Listed and Other Protected Species <ul style="list-style-type: none"> • Desert Tortoise Biological Opinion • Migratory Bird Treaty Act • Wildlife Bio-diversity • Wildlife Management <ul style="list-style-type: none"> • Adaptive Management • Management Strategies • Proposed/Candidate Species • Species of Interest • Mohave Ground Squirrel • Integration with Other Plans 	<p>Minor impacts-Target species using directed back-pack spraying and use of biodegradable pesticides. Seasonal application avoids non-target species</p> <p>Adherence to USFWS terms and conditions and requirements of the Migratory Bird Treaty Act ensure no adverse effects would occur.</p> <p>Enhancement of Piute Ponds and Branch Park pond, restoring habitat, stocking upland game birds, benefits and promotes biodiversity.</p> <p>Promotes use of BMPs, planting native plants, and using native seeds to replicate natural bio-diversity.</p> <p>Positive benefit - Adaptive techniques would occur based on monitoring and tracking to ensure goals and objectives are met or exceeded. Management strategies minimize risk of critical habitat designation on base for proposed and candidate species for listing, state listed species, and species of interest. Integration of management actions supports common goals and objectives</p>	<p>Same as Alternative A.</p> <p>Same as Alternative A.</p> <p>Promotes biodiversity to a higher degree than Alternative A due to a higher number of projects planned for implementation.</p> <p>Same as Alternative A but to a higher degree.</p> <p>More positive benefits than Alternative A due to increased number of projects planned for implementation and increased development of strategies for listed, proposed and candidate species for listing, state listed species, and species of interest.</p>	<p>No impacts to non-target species.</p> <p>Same as Alternative A.</p> <p>Enhancement of Branch Park pond, stocking fish, installing and maintaining guzzlers, maintains biodiversity for wildlife.</p> <p>Substantially fewer projects planned for implementation and use of BMPs; maintains some bio-diversity.</p> <p>Fewer benefits than Alternatives A and B due to a very minimal number of projects planned for implementation.</p>

TABLE 2-1 SUMMARY OF THE POTENTIAL ENVIRONMENTAL IMPACTS (CONTINUED)

ENVIRONMENTAL ISSUE	ALTERNATIVE A – NO ACTION	ALTERNATIVE B – HIGH LEVEL MANAGEMENT ACTION	ALTERNATIVE C – LOW LEVEL MANAGEMENT ACTION
<p>CULTURAL RESOURCES</p> <ul style="list-style-type: none"> • Presence of sites within the Area of Potential Effect (APE) • Eligible or potentially eligible sites for listing to the National Register • Ability to avoid sites 	<p>NEPA review, and integrated and coordination approach with the BHPO minimizes impacts to known cultural resource sites and APE's.</p> <p>Yes.</p> <p>Yes.</p>	<p>Same as Alternative A.</p> <p>Yes.</p> <p>Yes.</p>	<p>Same as Alternative A.</p> <p>Yes.</p> <p>Yes.</p>
<p>SOILS</p> <ul style="list-style-type: none"> • Extent of ground disturbance • Duration of ground-disturbing activities • Erosion 	<p>Minor impacts - Limited restoration projects in remote areas as required by Section 7 Consultation (USFWS Biological Opinions).</p> <p>Temporary disturbances, typically one growing season.</p> <p>Systematic repair of identified areas; mostly on ERP disturbed sites base-wide, including developed areas and remote areas.</p>	<p>Minor impacts - More ground disturbance related to restoration and invasive plant removal projects in remote areas than Alternative A.</p> <p>Same as Alternative A.</p> <p>Same as Alternative A; planned in remote areas.</p>	<p>Extremely minor from installation of wildlife guzzlers and desert tortoise exclusion fence.</p> <p>Same as Alternative A.</p> <p>Repair of identified severe problem areas determined critical to the Air Force mission.</p>

TABLE 2-1 SUMMARY OF THE POTENTIAL ENVIRONMENTAL IMPACTS (CONCLUDED)

ENVIRONMENTAL ISSUE	ALTERNATIVE A – NO ACTION	ALTERNATIVE B – HIGH LEVEL MANAGEMENT ACTION	ALTERNATIVE C – LOW LEVEL MANAGEMENT ACTION
<p>SOCIOECONOMIC</p> <ul style="list-style-type: none"> • Contract support • Labor/supplies 	<p>Some of the resource projects are expected to be contracted to private contractors who have specific expertise.</p> <p>Some restoration supplies, and fewer herbicides and pesticides would be expected to be purchased locally.</p>	<p>Similar to Alternative A, but a higher number of projects would be contracted out to companies with specific expertise</p> <p>Similar to Alternative A, with more projects and required supplies.</p>	<p>Only a few projects would require specific expertise. Nearly all projects are limited to being accomplished by Air Force personnel.</p> <p>Minimal supplies would be expected to be purchased locally.</p>
<p>RECREATION</p> <ul style="list-style-type: none"> • Recreation • Hunting Program • Fishing Program • Birding • Education Tours 	<p>Minimal beneficial impacts would be realized from ongoing management of the hunting program. No improvements to the hunting program would be implemented such as monitoring hunting activities and tracking hunter use.</p>	<p>No beneficial impacts are expected for recreation opportunities.</p>	<p>Many beneficial impacts are expected due to enhancement of Piute Ponds habitat to attract wildlife for birding, hunting, and educational wildlife tours as well as fishing opportunities at Branch Park Pond. Installing and maintaining wildlife guzzlers increase hunting success for hunters and promote morale and welfare of base personnel and off-base personnel who have hunting privileges on base.</p>

3.0 AFFECTED ENVIRONMENT

This section describes the relevant resources at Edwards AFB which may impact or which may be impacted by any of the action alternatives when 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, Solid and Green Waste, Biological Resources, Cultural Resources, Soils, Socioeconomics, Recreation and Quality of Life, and Environmental Justice and Protection of Children.

3.1 Land Use

Land use at Edwards AFB is designated according to the predominant function of a given area. Land may be used for a variety of purposes, including residential, industrial, commercial, conservation areas, recreation, and military. The Base General Plan (412 TW/CEAO, 2013) lays out the long-range development at Edwards AFB. This Plan establishes the goals, policies, plans and anticipated actions regarding the physical, social and economic environments of the base.

Edwards AFB's lands can be classified using three land categories: improved, semi-improved, and unimproved. Of the total area encompassed by the base, 92.5 percent (284,452 acres) is unimproved land. Semi-improved lands account for about 4.5 percent (13,838 acres) of the total, and improved land accounts for about 3.0 percent (9,225 acres).

Edwards AFB consists of approximately 307,517 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, experimental aircraft, and design and testing of rocket engines. The developed portion of the Base, approximately 6 percent of the total Base area, 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 Air Force Research Laboratory (AFRL).

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 found at Edwards AFB. Within these various land use designations, specific areas have been set aside for a particular purpose, such as the outdoor recreation areas (Figure 3-1). These include, but are not limited to the ORVAs I and II, Mountain Bike Area, hunting and fishing areas, and ranges.

3.1.1 Management Areas

Edwards AFB is a large installation that supports a diversity of resources and mission activities. In developing an overall natural resources management strategy for the installation,

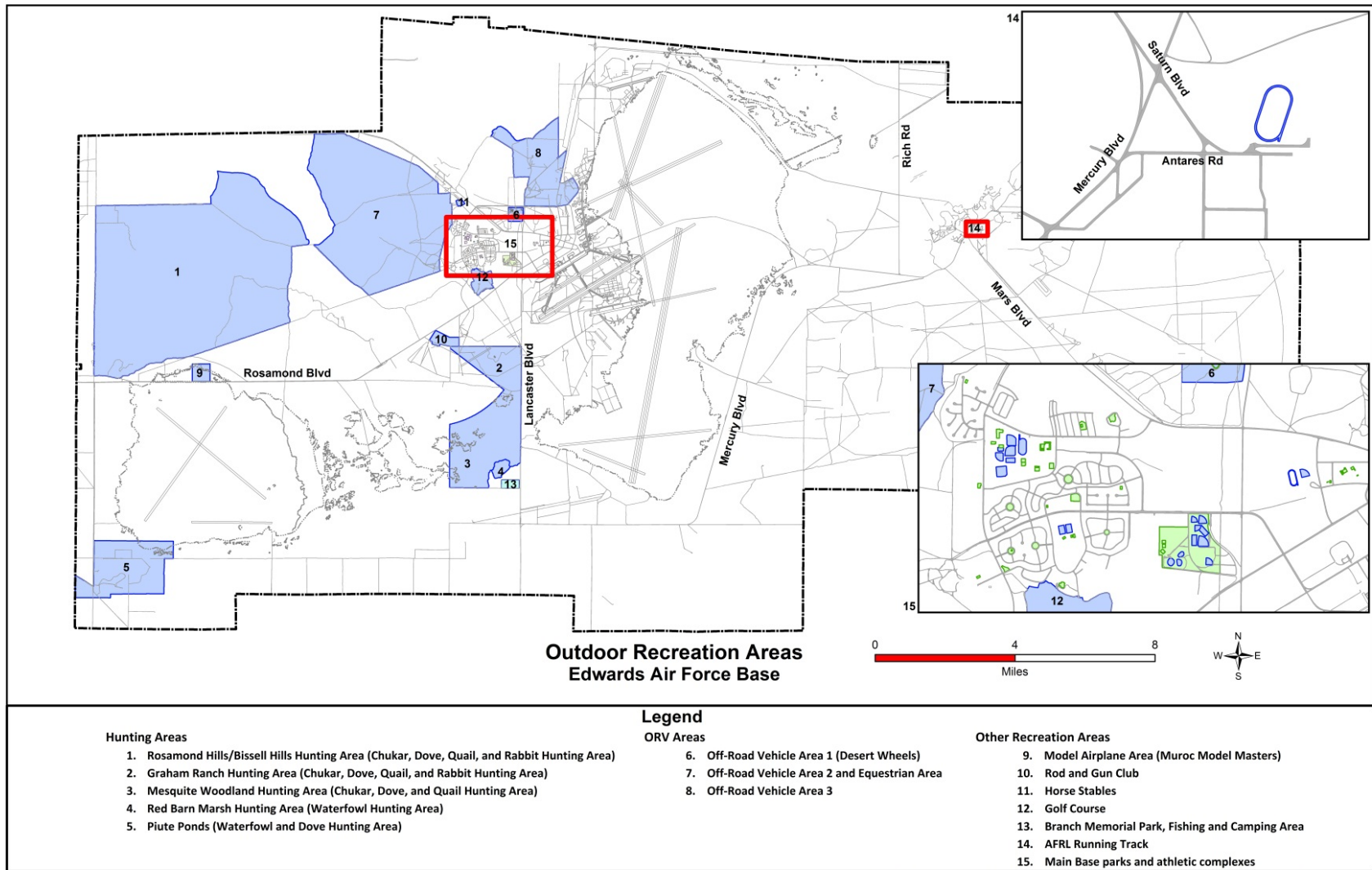


Figure 3-1 Outdoor Recreation Areas

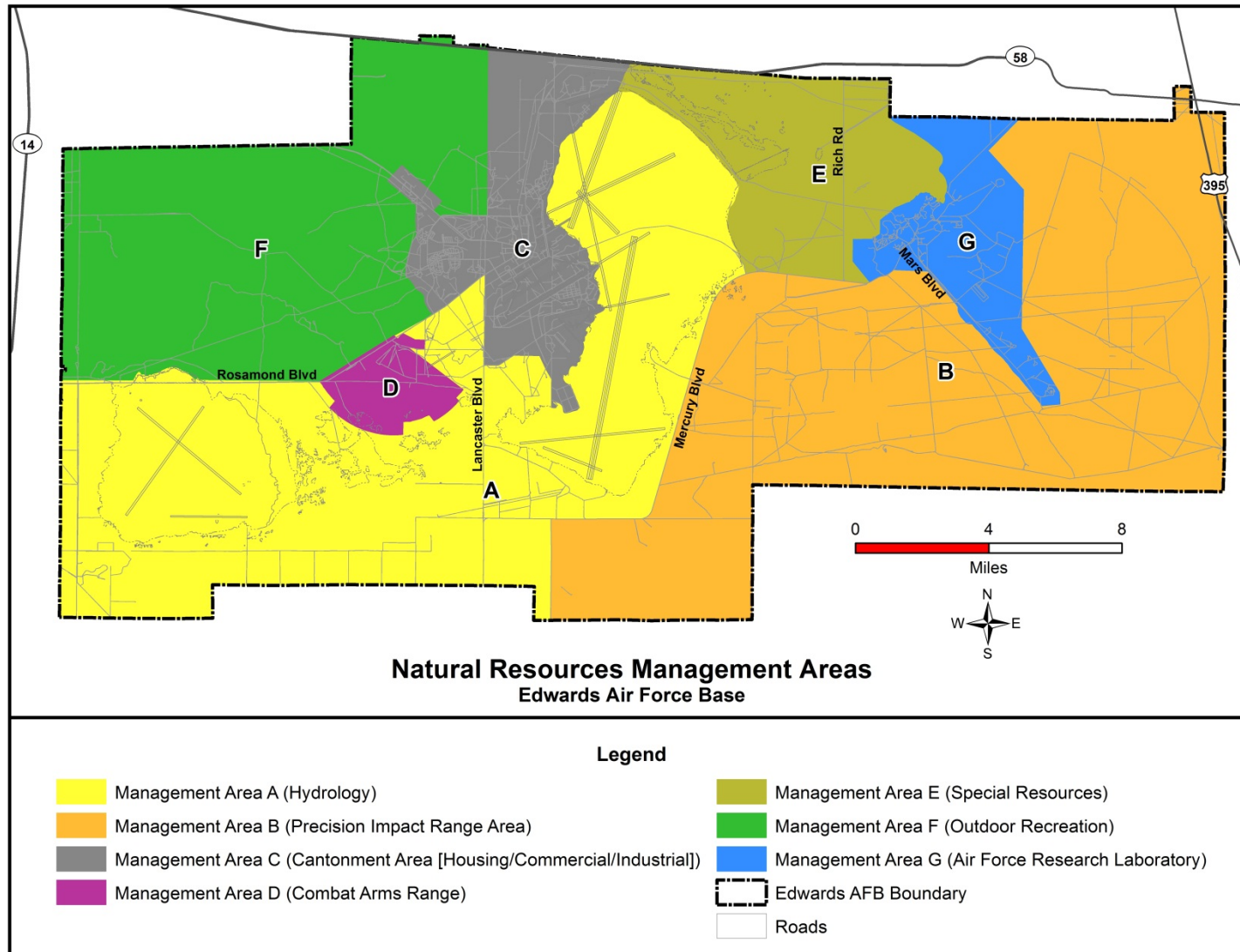
the Base property has been divided into smaller, more manageable units to facilitate oversight of activities and management of natural resources. These units are called Management Areas. In delineating Management Areas at Edwards AFB, consideration was given to the types of activities, both current and planned/proposed, as well as to the presence and condition of natural habitats and resources. Using this approach, Natural Resources Management Units originally identified in the *Integrated Natural Resources Management Plan* (95 ABW 2008) have been consolidated now into seven Management Areas (Figure 3-2). Management strategies have been identified for each Management Area that integrate mission and support uses (i.e., recreational uses) with natural resource conservation. Specific projects and activities that may be implemented in each Management Area to meet the management goals are listed in the INRMP.

The following seven management areas are currently defined on Edwards AFB:

1. Hydrology – Management Area A;
2. Precision Impact Range Area (PIRA) – Management Area B;
3. Cantonment Area (Housing/Commercial/Industrial) – Management Area C;
4. Combat Arms Range (CAR) – Management Area D;
5. Special Resources – Management Area E;
6. Outdoor Recreation – Management Area F; and
7. AFRL – Management Area G.

Management Area A includes areas that are primarily inundated with water and transfer of water via drainages and slopes from storm events. This includes Rosamond Dry Lake, Rogers Dry Lake, Buckhorn Dry Lake, numerous clay pans, and the Piute Ponds Complex. The Los Angeles County Sanitation District 14 (District 14) also provides a minimum of 2.5 million gallons per day (mgd) of mostly tertiary treated water to the Piute Ponds Complex in the southwest corner of the base. Management Area A also includes military paratrooper exercises and aircraft cargo drop zones. Management Area B includes the PIRA (active range and targets and 60,800 acres designated as critical habitat for desert tortoise). Management Area C includes the developed areas of significant infrastructure such as buildings, facilities, hangars, taxiways, runways, monitoring wells, housing tracts, clinics, etc. within Main Base, North Base, and South Base. Management Area D includes the Combat Arms Range where the Rod and Gun Club exist and where small arms fire training and certification is conducted. Management Area E includes a remote desert area with dense stands of vegetation and one aircraft tracking building. Management Area F includes a large hunting area, a proposed solar area, a drop zone, and aircraft radar tracking facilities located at various elevations. Management G includes the AFRL (rocket motor and rocket engine test facilities and test stands with associated infrastructure), and monitoring wells, but is relatively undisturbed desert. Management Area G is also a release area for juvenile desert tortoises that are associated with the Desert Tortoise Head Start Program.

Edwards AFB contains 5 natural resource areas associated with Land Use Restrictions: desert tortoise critical habitat, mesquite woodlands, burrowing owl conservation area, Branch Park, and Piute Ponds. Natural resource management occurs within these areas. A discussion of biological resources associated with these areas can be found in Section 3.5, Biological Resources.



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Figure 3-2 Natural Resource Management Areas

3.1.2 Airfield Operations

Use of the Edwards AFB airfield is limited to authorized personnel only, such as the Air Force, 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.

The term foreign object damage (FOD) refers to damage, particularly to aircraft, which 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 at flightline areas and implementation procedures are contained in the Edwards Air Force Base Supplement to AFI 21-101, *Aircraft and Equipment Maintenance Management*. The Quality Assurance Division (412 MXG/MXQ) manages the reduction and/or elimination of FOD.

3.1.3 Noise (Annoyance)

Sound can vary simultaneously in level (or loudness) and frequency content (pitch), while also varying in time of occurrence and duration. The fundamental measure of sound levels is expressed in units of decibels (dB) using a logarithmic scale. Common sounds vary greatly in amplitude over a very large range. For instance, an aircraft flyover may produce pressure amplitude of a hundred times greater than a car driving by on a nearby street. On the logarithmic scale, these noise sources would differ by 40 dB.

Noise is generally defined as sound that is undesirable because it:

- a. is intense enough to damage hearing,
- b. interferes with speech communication and sleep, or
- c. is annoying.

The Federal Interagency Committee on Urban Noise has developed land use compatibility guidelines for noise and provides recommended day-night average sound level (DNL) ranges for various land use categories based on this committee's findings. The DNL values of 65 dB and less are generally compatible with all types of land uses. Residential, public, and some types of recreational land uses (e.g., outdoor music amphitheaters, nature reserves, etc.) are generally not considered compatible with yearly DNL ranges in excess of 65 dB. Commercial, industrial, and other types of recreational land uses (e.g., sports arenas, golf courses, amusement parks, etc.) are generally considered compatible with yearly DNL ranges between 70 and 75 dB, if measures are incorporated into the design and construction of structures associated with these land uses. Some transportation (i.e., railways, airports) and manufacturing land uses (i.e., mining, non-livestock agriculture, fishing, and forestry) can tolerate yearly DNL ranges in excess of 85 dB.

3.2 Air Quality

Air quality for any particular region is defined by the amount of air pollutants compared to a federal or state air quality standard. Ambient air quality is affected by a variety of human or anthropogenic activities as well as by naturally occurring or biogenic sources (such as

wind-blown dust). Primary sources of air pollution from anthropogenic activity include stationary sources (e.g., boilers, internal combustion engines, and paint spray booths) and mobile sources (e.g., cars, trucks, buses, and airplanes). Within the State of California, the authority to regulate mobile sources of air emissions resides with the California Air Resources Board (CARB). The authority to regulate stationary sources of air emissions is delegated by the U.S. Environmental Protection Agency (EPA) to local air pollution control districts and air quality management districts, with state oversight provided by the CARB. Edwards AFB is located within the jurisdiction of three local air districts: the Eastern Kern Air Pollution Control District (EKAPCD), the Mojave Desert Air Quality Management District (MDAQMD) and the Antelope Valley Air Quality Management District (AVAQMD) (Figure 3-3). (Note: All other criteria pollutants are either in attainment or unclassified for each district, so are not listed in the purple boxes).

3.2.1 National Ambient Air Quality Standards

The significance of pollutant concentration is determined by comparing ambient measured concentration levels to the National Ambient Air Quality Standards (NAAQS) and the California Ambient Air Quality Standards (CAAQS). The standards represent the maximum allowable atmospheric concentrations that may occur, while ensuring protection to public respiratory health and welfare, under reasonable margins of safety.

Under the NAAQS, the U.S. EPA has developed standards for six criteria pollutants: ozone, fine particulate matter equal to or less than 2.5 microns and 10 microns (PM_{2.5} and PM₁₀), carbon monoxide, nitrogen dioxide, sulfur dioxide and lead. In addition, volatile organic compounds and nitrogen oxides are classified as ozone precursor pollutants and are subject to further regulations. The CARB has developed similar standards based on CAAQS for the same six criteria pollutants in addition to visibility-reducing particles, sulfates, hydrogen sulfide and vinyl chloride.

While the EPA sets national standards for air quality in the form of NAAQS, California law authorizes the ARB to set ambient (outdoor) air pollution standards (California Health & Safety Code, Section 39606) in consideration of public health, safety and welfare. The CAAA recognized that states should take the lead on protecting air quality at the local level because pollution control problems typically require knowledge of local conditions, industry and geography. The state-specific standards may be more stringent than EPA standards, but cannot be less stringent and are enforceable under federal law once approved by EPA.

The CARB and U.S. EPA track air quality on an ongoing basis and classify areas or basins as either attainment or nonattainment, based on the concentration of criteria pollutants. If standards for criteria pollutants are met in a particular area, the area is designated as attainment. Once an area is classified as nonattainment, the degree of nonattainment is divided into categories of marginal, moderate, serious, severe or extreme. Areas are designated as unclassified when standards have not been established or when there is a lack of monitoring data for criteria pollutants. Unclassified areas are treated as attainment areas until proven otherwise. Please see Figure 3-3 for the current classifications for each criteria pollutant in each district.

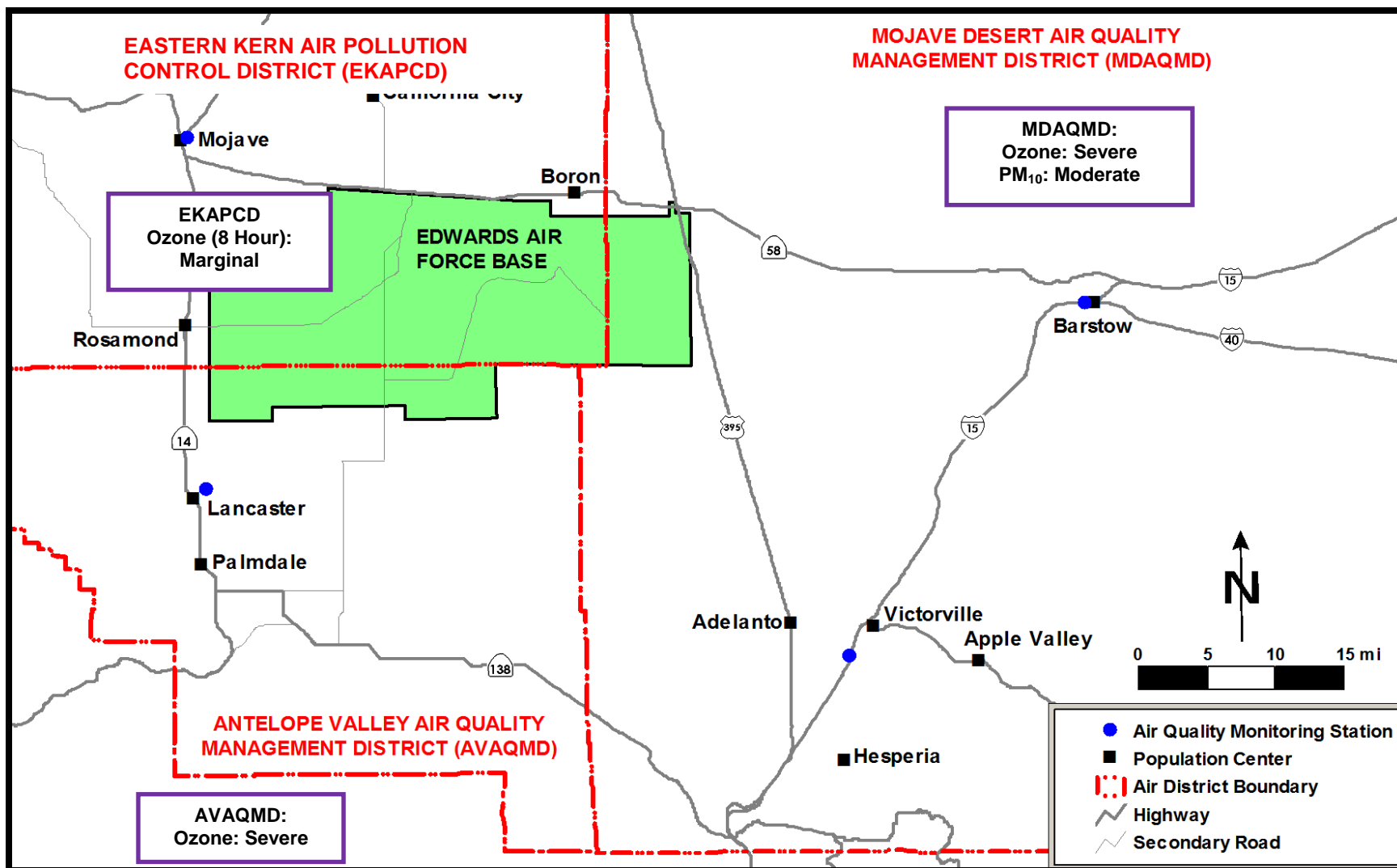


Figure 3-3 Air District Boundaries & NAAQS Nonattainment Status Map

States are also required to develop a State Implementation Plan (SIP) that sets forth how the CAAA provisions will be implemented. The SIP is the primary means for the implementation, maintenance and enforcement of the measures required to attain and maintain the NAAQS. The purpose of the SIP is twofold 1) it must provide a control strategy resulting in the attainment and maintenance of the NAAQS; and 2) it must demonstrate that progress is made in attaining the standards in each nonattainment area. The authority to regulate sources of air emissions resides with the ARB and is delegated to local air pollution control and air quality management districts. Local districts enact rules and regulations to achieve SIP requirements. Table 3-1 presents the NAAQS and CAAQS.

3.2.2 Hazardous Air Pollutants

In addition to the requirements for regulation of criteria pollutants, the CAAA also sets forth regulations to control emissions of hazardous air pollutants (HAP) from stationary sources. The HAPs are defined as air pollutants that may cause an increase in fatalities or in serious, irreversible or incapacitating illness. The HAP emission sources at Edwards AFB for natural resource projects can occur from mobile sources such as: internal combustion engines, driving on dirt roads, and prescribed burns. The HAP potential-to-emit threshold values are 10 tons per year for a single HAP and 25 tons per year for any two or more HAPs. The U.S. EPA is required to separate out particular source categories of HAPs into National Emissions Standards for Hazardous Air Pollutants (NESHAP). Edwards AFB is defined as a major source of HAPs and must comply with many NESHAPs.

Ambient Air Quality Standards						
Pollutant	Averaging Time	California Standards ¹		National 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	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m ³)		0.075 ppm (147 µg/m ³)		
Respirable Particulate Matter (PM ₁₀)	24 Hour	50 µg/m ³	Gravimetric or Beta Attenuation	150 µg/m ³	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m ³		—		
Fine Particulate Matter (PM _{2.5})	24 Hour	—	—	35 µg/m ³	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m ³	Gravimetric or Beta Attenuation	15 µg/m ³		
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m ³)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m ³)	—	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m ³)		9 ppm (10 mg/m ³)	—	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m ³)		—	—	
Nitrogen Dioxide (NO ₂) ⁸	1 Hour	0.18 ppm (339 µg/m ³)	Gas Phase Chemiluminescence	100 ppb (188 µg/m ³)	—	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 µg/m ³)		0.053 ppm (100 µg/m ³)	Same as Primary Standard	
Sulfur Dioxide (SO ₂) ⁹	1 Hour	0.25 ppm (655 µg/m ³)	Ultraviolet Fluorescence	75 ppb (196 µg/m ³)	—	Ultraviolet Fluorescence; Spectrophotometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1300 µg/m ³)	
	24 Hour	0.04 ppm (105 µg/m ³)		0.14 ppm (for certain areas) ⁹	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas) ⁹	—	
Lead ^{10,11}	30 Day Average	1.5 µg/m ³	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 µg/m ³ (for certain areas) ¹¹	Same as Primary Standard	
	Rolling 3-Month Average	—		0.15 µg/m ³		
Visibility Reducing Particles ¹²	8 Hour	See footnote 12	Beta Attenuation and Transmittance through Filter Tape	No National Standards		
Sulfates	24 Hour	25 µg/m ³	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m ³)	Ultraviolet Fluorescence			
Vinyl Chloride ¹⁰	24 Hour	0.01 ppm (26 µg/m ³)	Gas Chromatography			

See footnotes on next page ...

Table 3-1 Current NAAQS and CAAAS (CARB, Version 6/7/2012)

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide and 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 Section 70200 of Title 17 of the California Code of Regulations.

2. National standards (other than ozone, particulate matter, and those based on 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 measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above $150 \mu\text{g}/\text{m}^3$ is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national 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°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume or micromoles of pollutant per mole of gas.

4. Any equivalent measurement method which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.

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 known or anticipated adverse effects of a pollutant.

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

8. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

9. On June 2, 2010, a new 1-hour SO₂ standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO₂ national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

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

11. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard ($1.5 \mu\text{g}/\text{m}^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

12. In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

3.2.3 Greenhouse Gas Emissions and Regulations

Climate change potentially poses a serious threat to the economic well-being, public health, natural resources and the environment. Global warming is projected to have detrimental effects on industries, including agriculture and tourism, increase the strain on electricity supplies and contribute to unhealthy air. National and international actions are necessary to fully address the issue of global warming. Over the past 71 years as indicated in the INRMP appendices, the amount of rainfall averaged 5.13 inches/year. Over the past 41 years, six annual rainfall amounts spiked upward ranging from 12.39 inches to 15.76 inches. The data show some increases in annual rainfall for years between 1973 and 2013 compared to years between 1942 and 1972. Seasonal low and high temperatures over the past 71 years for the base seems to indicate no discernible fluctuation. However, action taken by the federal government and California to reduce emissions of greenhouse gases will have important effects by reducing emissions of greenhouse gases (GHG). GHGs include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), sulfur hexafluoride, hydrofluorocarbons and perfluorocarbons. GHGs are typically reported as “Carbon dioxide equivalent” or “CO₂ equivalent” or “CO₂e” which provides a measure for comparing CO₂ with other GHGs, based on the quantity of those gases multiplied by the appropriate number of metric tons of CO₂ emissions with the same global warming potential (GWP) factor and commonly expressed as one metric ton of carbon dioxide equivalents (MTCO₂e) ton of another greenhouse gas. Global warming potential values listed in Table A-1 of 40 CFR Part 98 are used to determine the CO₂ equivalent of emissions.

On 30 October 2009, EPA issued the Mandatory Reporting of Greenhouse Gases Rule (EPA Mandatory Reporting Rule [MRR]). The EPA MRR applies to direct GHG emitters, fossil fuel suppliers and industrial gas suppliers, with a reporting threshold of 25,000 metric tons (MT) or more of carbon dioxide equivalent (CO₂e) per year. The purpose of this rule is to collect accurate and timely GHG data to inform future policy decisions.

The EPA MRR applies to direct GHG emitters, fossil fuel suppliers and industrial gas suppliers, with a reporting threshold of actual emissions of 25,000 MT or more of CO₂e per year. Reporting is at the facility level. Most importantly, EPA allows military installations to use distinct independent functional groupings to define the reporting facility as follows:

“Facility means any physical property, plant, building, structure, source, or stationary equipment located on one or more contiguous or adjacent properties in actual physical contact or separated solely by a public roadway or other public right-of-way and under common ownership or common control, that emits or may emit any greenhouse gas. Operators of military installations may classify such installations as more than a single facility based on distinct and independent functional groupings within contiguous military properties.”

On 15 December 2011, the California Office of Administrative Law approved the revised ARB GHG MRR with an effective date of 1 January 2012. For Edwards AFB, all reports, which began with the 2013 submittal of 2012 data, must comply with the abbreviated reporting requirements. The ARB is the agency responsible for determining compliance with this regulation.

The revisions most relevant to Edwards AFB's activities include, but are not limited to:

1. A reduction in the applicability threshold for stationary combustion facilities from 25,000 MT to 10,000 MT of CO₂e AND an aggregate maximum heat input capacity of 12 million British thermal units per hour (MMBtu/hr) or greater.

2. Facilities generating between 10,000 MT and 25,000 MT CO₂e may submit an abbreviated GHG report. Third party verification is not required.

Affected facilities submit reports annually and provide data collected during the previous calendar year (CY). Reports for CY 2010 were due on 30 September 2011. Reports for future years are due on 31 March for emissions in the previous CY. The annual reports are submitted to EPA electronically using an electronic GHG reporting tool (e-GGRT), which is accessed through the Regulation's webpage. EPA verifies the data submitted and, unlike the California regulation, does not require third party verification. Prior to EPA verification, reporters are required to self-certify the data submitted to EPA.

During 2010 and 2011, ARB proposed various changes to the California MRR to harmonize its GHG emissions reporting requirements with the EPA MRR and the California Cap-and-Trade Program. By aligning requirements with federal requirements and other state programs, ARB aimed to minimize duplicative reporting by developing a unified reporting system that is compatible with all GHG programs.

On 14 December 2011, the California Office of Administrative Law approved the amended regulation. The amendments relevant to Edwards AFB's activities include, but are not limited to:

- An increase in the applicability threshold for electricity generation facilities from 2,500 MT to 10,000 MT of CO₂e.
- A reduction in the applicability threshold for Stationary Combustion facilities from 25,000 MT to 10,000 MT of CO₂e and an aggregate maximum heat input capacity of 12 MMBtu/hr or greater.
- Facilities generating between 10,000 MT and 25,000 MT CO₂e may submit an abbreviated GHG report. Abbreviated GHG reports are:
 - Due no later than 1 June of each CY,
 - Based on default emission factors and default fuel heating values,
 - Not required to keep a written GHG Monitoring Plan,
 - Not required to undergo third party verification, and
 - First submission reported 1 June 2013 for CY 2012 GHG emissions; no reporting is required for CY 2010 or CY 2011 emissions.

3.2.4 Conformity Requirements

Section 176(c) of the CAAA-90 contains legislation for the general conformity rule and prohibits federal agencies from conducting, supporting or approving actions that do not conform to an approved SIP.¹ Federal agencies are required to conduct a conformity review to demonstrate their actions conform with the approved SIP for the nonattainment or maintenance area prior to initiating the action. Under Title I of the CAAA-90, Congress established two types of conformity: transportation conformity and general conformity. Transportation conformity pertains to federal transportation projects and requires these projects to conform with transportation aspects of an approved SIP. General conformity covers all other federal actions not addressed by transportation conformity. The two conformity provisions only affect federal actions occurring in nonattainment areas and maintenance areas. This proposed action does not involve a federal transportation project; therefore, the air quality analysis for this EA focuses only on general conformity.

Federal facilities located in a NAAQS nonattainment area (Figure 3-3) are required to comply with federal air conformity rules and regulations in 40 CFR 51 and 93, General Air Conformity Regulations. Under General Conformity, a facility that initiates an action must quantify air emissions from associated stationary and mobile sources. To determine the relevant compliance requirements, calculated emissions are first compared to established *de minimis* threshold emission levels based on the nonattainment status for each applicable criteria pollutant in the area of concern. If the analysis finds that the project emissions are less than the threshold levels, then a conformity determination is not required. Table 3-2 presents the *de minimis* levels for each attainment level as applicable to this project.

A conformity determination is not required for Federal actions (or portion thereof) that includes major or minor new or modified stationary sources that require a permit under the new source review (NSR) program (Section 110(a)(2)(c) and Section 173 of the Act) or the prevention of significant deterioration program (title I, part C of the Act).

Table 3-2 General Conformity *De Minimis* Levels

Pollutant	Area Type	Tons/Year
Ozone (VOC or NOx)	Serious nonattainment	50
	Severe nonattainment	25
	Extreme nonattainment	10
	Other areas outside an ozone transport region	100
PM-10	Serious nonattainment	70
	Moderate nonattainment and maintenance	100

Source: <http://www.epa.gov/airquality/genconform/deminimis.html>

¹ The federal conformity rule is codified in 40 CFR 93.

3.2.5 California Environmental Quality Act

The California Environmental Quality Act (CEQA) is a statute that requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible.

CEQA applies to certain activities of state and local public agencies. A public agency must comply with CEQA when it undertakes an activity defined by CEQA as a "project." A project is an activity undertaken by a public agency or a private activity which must receive some discretionary approval (meaning that the agency has the authority to deny the requested permit or approval) from a government agency which may cause either a direct physical change in the environment or a reasonably foreseeable indirect change in the environment.

Some proposed projects do not have significant (as defined by CEQA, Section 21068) air quality impacts on the environment. The EKAPCD, MDAQMD and AVAQMD all provide specific exemptions or levels of significance in their CEQA Guidelines.¹

The following identify exempt EKAPCD projects if the operation will:

1. Emit (from all project sources subject to EKAPCD Rule 201) less than offsets trigger levels set forth in Subsection III.B.3. of EKAPCD's Rule 210.1 (New and Modified Source Review Rule);
2. Emit less than 137 pounds per day of NO_x or Reactive Organic Compounds from motor vehicle trips (indirect sources only);
3. Not cause or contribute to an exceedance of any California or National Ambient Air Quality Standard;
4. Not exceed the District health risk public notification thresholds adopted by the EKAPCD Board; and
5. Be consistent with adopted federal and state Air Quality Attainment Plans.

State CEQA Guidelines also provide that certain categories of projects are exempt from environmental review except in certain instances, e.g., unusually sensitive location or other circumstances. (see CEQA Guidelines Section 15300.2).

For example, projects exempt from EKAPCD permits pursuant to EKAPCD Rule 202 are not subject to CEQA review by the District. Projects consisting of installation or modification of the following equipment or operations are considered by the EKAPCD to be exempt from CEQA because by complying with EKAPCD's Rules and Regulations they do not have the potential for significant environmental impact (see EKAPCD Rule 208.2):

¹ The following are web links to the specific District CEQA Guidelines document:
MDAQMD: <http://www.mdaqmd.ca.gov/Modules/ShowDocument.aspx?documentid=2910>
EKAPCD: http://www.kernair.org/Documents/CEQA/CEQA_Guidelines%20&%20Charts.pdf
AVAQMD: <http://www.avaqmd.ca.gov/Modules/ShowDocument.aspx?documentid=2911>

Specific Exemptions (based on vehicles and equipment used to manage natural resources):

Piston Engines - natural gas, gasoline, or diesel fueled

Portable equipment which meets requirements of CH & SC, Section 41753

Within MDAQMD jurisdiction, any project is significant if it exceeds the Significance Thresholds specified in the MDAQMD CEQA Guidelines (August 2011), as shown below:

1. The project generates total emissions (direct and indirect) in excess of the following thresholds (Table 6; MDAQMD CEQA Guidelines – only thresholds relevant to this project are listed):

- a) Greenhouse Gases (CO₂e): 100,000 tons/year; 548,000 lb/day
- b) Oxides of Nitrogen (NO_x): 25 tons/year; 137 lb/day
- c) Volatile Organic Compounds (VOC): 25 tons/year; 137 lb/day
- d) Particulate Matter (PM₁₀) 15 tons/year: 82 lb/day
- e) Particulate Matter (PM_{2.5}): 15 tons/year: 82 lb/day

2. Generates a violation of any ambient air quality standard when added to the local background;

3. Does not conform with the applicable attainment or maintenance plan(s);

4. Exposes sensitive receptors to substantial pollutant concentrations, including those resulting in a cancer risk greater than or equal to 10 in a million and/or a Hazard Index (HI) (non-cancerous) greater than or equal to 1.

A significant project must incorporate mitigation sufficient to reduce its impact to a level that is not significant.

AVAQMD's CEQA Significance Thresholds are identical to those presented above (AV CEQA & Conformity Guidelines, August 2011).

3.3 Safety and Occupational Health

Health and safety is defined as the protection of workers and the public from hazards (flightline operations and construction vehicles and heavy equipment. 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. The statutory and regulatory requirements of the Federal OSHA and AFOSH standards that apply to the safety and occupational health of DoD workers on Edwards AFB are enforced locally by Bioenvironmental Engineering, AFTC Safety, and the Base Fire Department.

3.3.1 Bird Air Strike Hazard (BASH)

Methods that have been used to reduce the Bird Aircraft Strike Hazard (BASH) risk at Edwards AFB include habitat management, hazing, and lethal removal of birds. Habitat

management involves eliminating standing water and revegetation of disturbed areas with native shrubs and annuals. It also involves elimination of perching, roosting and nesting sites. Airfield Management uses pyrotechnics to haze birds away from the airfield. In the past a falconer was employed to scare birds away from the active runway. As a last resort, lethal removal of birds may be conducted to reduce the BASH risk. Surveys are conducted to monitor bird migration along the airfield runways to identify bird species and when they are migrating through the area.

From 2004 to 2011, approximately 124 bird airstrikes were recorded at Edwards AFB. Most of the birds involved in aircraft strikes along the main runways were identified as horned larks (*Eremophila alpestris*) (BASH report 2013). However, pigeons, house finches, common ravens, owls and other birds are found in hangars and along the flightline.

3.4 Hazardous Materials and Solid Waste

A hazardous material is any material whose physical, chemical, or biological characteristics, quantity, or concentration may cause or contribute to adverse effects in organisms or their offspring; pose a substantial present or future danger to the environment; or result in damage to or loss of equipment, property, or personnel. For purposes of this analysis, the term hazardous material refers to pest management activities used to control growth of exotic plants and weeds.

Solid waste refers to nonhazardous sludge and vegetation removed from the Piute Ponds Complex and exotic and invasive plants removed from restoration sites. Solid waste also refers to concrete used to stabilize the banks at Piute Ponds and replacement of weirs used to regulate water flow to the various ponds.

3.5 Biological Resources

In general, biological resources include native and introduced plants that comprise the various habitats, the animals that are found in such habitats, and natural areas that help to support plant and wildlife populations. Edwards AFB contains and manages biological resources that are typical of a desert environment. These include animal and plant species (including the associated habitats of each), floodplains, and watersheds. Naturally occurring organisms, the physical and biological aspects of their environment, and the relationships among them make up biological resources.

There are no natural lakes, natural ponds, and no permanent streams or rivers on Edwards AFB. However, a portion of the southwestern corner of the base contains man-made biological wetlands via delivery of tertiary treated water from the Los Angeles County Sanitation District (District 14) waste water treatment plant. These created ponds are not considered Waters of the United States or protected wetlands; these ponds are not jurisdictional.

3.5.1 Animal Species

While there are several species of interest at Edwards AFB, there is only one listed resident species with legally required management mandates; the desert tortoise (*Gopherus agassizii*). The desert tortoise is a federal and state listed threatened species. It is an 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.

In 1994, the USFWS designated portions of the Base as “desert tortoise critical habitat” (USFWS 1994). The boundary designated as “desert tortoise critical habitat” encompasses approximately 60,800 acres in the eastern and southeastern portions of Edwards AFB. Critical habitat is located within the boundary of the Precision Impact Range Area (PIRA); the PIRA is divided into three management zones with respect to the desert tortoise. Figure 3-4 shows the critical habitat boundary and Figure 3-5 shows the three management areas on the PIRA.

Zone 1 Management Area is the most disturbed of the areas on the PIRA due to AFTC operations (comprising precision bombing and infrared target areas). Zone 2 Management Area contains some disturbance, but most areas have not been greatly affected. Zone 3 Management Area is relatively undisturbed and contains most of the desert tortoise critical habitat on Base.

The lakebeds on Edwards AFB were surveyed and sampled to provide initial species identification and distribution of freshwater shrimp. Biologists have identified six eubranchiopod shrimp species in Rogers Dry Lake. These include: clam shrimp (*Eocyclus digueti*), tadpole shrimp (*Lepidurus lemmoni*), and three species of fairy shrimp (*Branchinecta mackini*, *B. gigas*, and *B. lindahli*) (AFFTC 1992), (Tetra Tech, Inc, 2006). Eubranchiopods lie dormant in the soil of dry lakebeds until flooding creates the aquatic habitat necessary to complete their life cycles. These shrimp are a food source for a variety of migratory shorebirds that congregate at Rosamond Dry Lake when water is present.

Common mammals on Edwards AFB include the black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audobonii*), and coyote (*Canis latrans*). Common rodents include the deer mouse (*Peromyscus maniculatus*), grasshopper mouse (*Onychomys torridus*), little pocket mouse (*Perognathus longimembris*), Merriam’s kangaroo rat (*Dipodymus merriami*), and desert woodrat (*Neotoma lepida*). Common bats include the California myotis (*Myotis californicus*), western red bat (*Lasiurus blossevillii*) and Yuma myotis (*Myotis yumanensis*). For a list of mammals 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 and Tetra Tech, Inc., 2009).

Table 3-3 lists wildlife species found within the project area and summarizes the concerns associated with them.

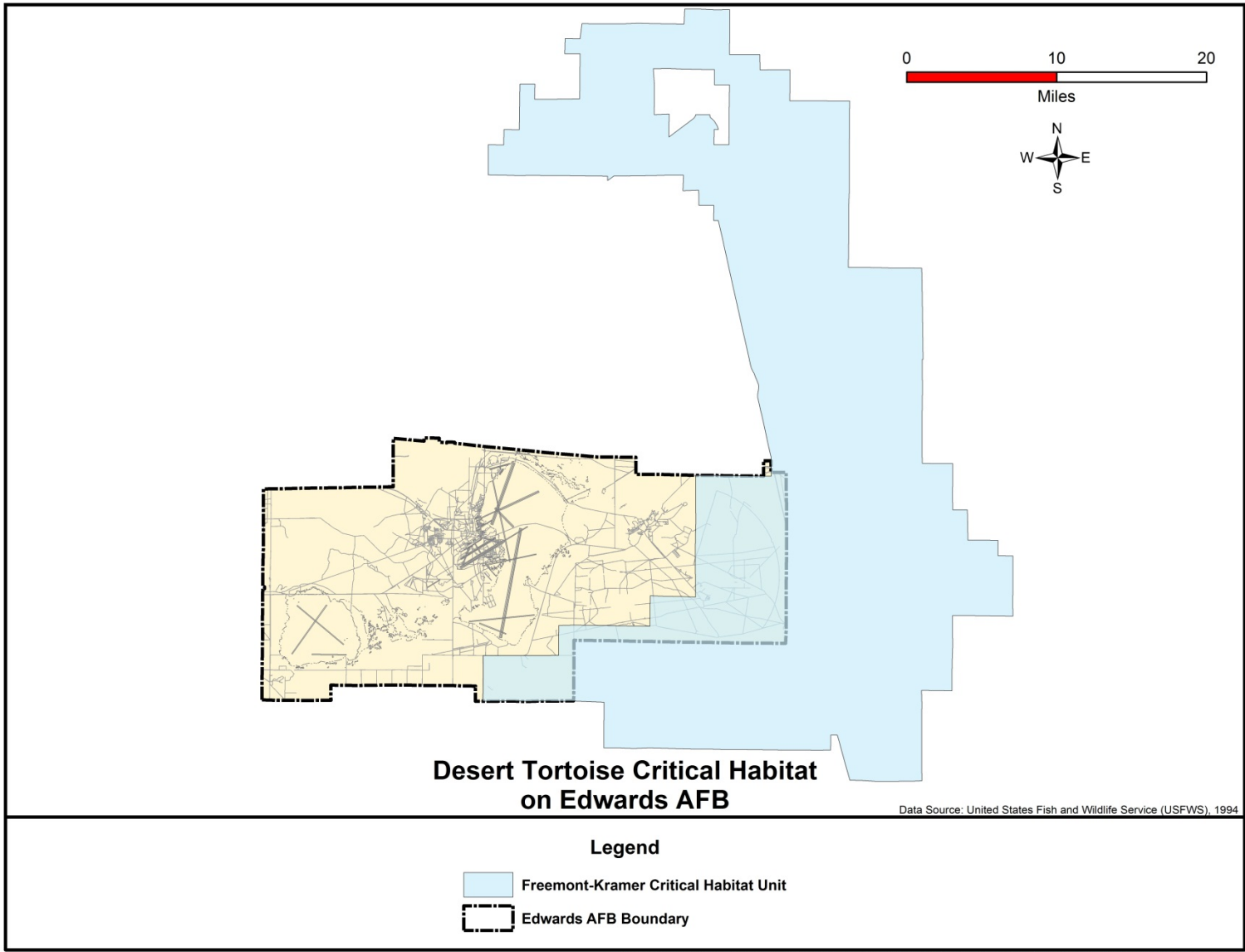


Figure 3-4 Desert Tortoise Critical Habitat

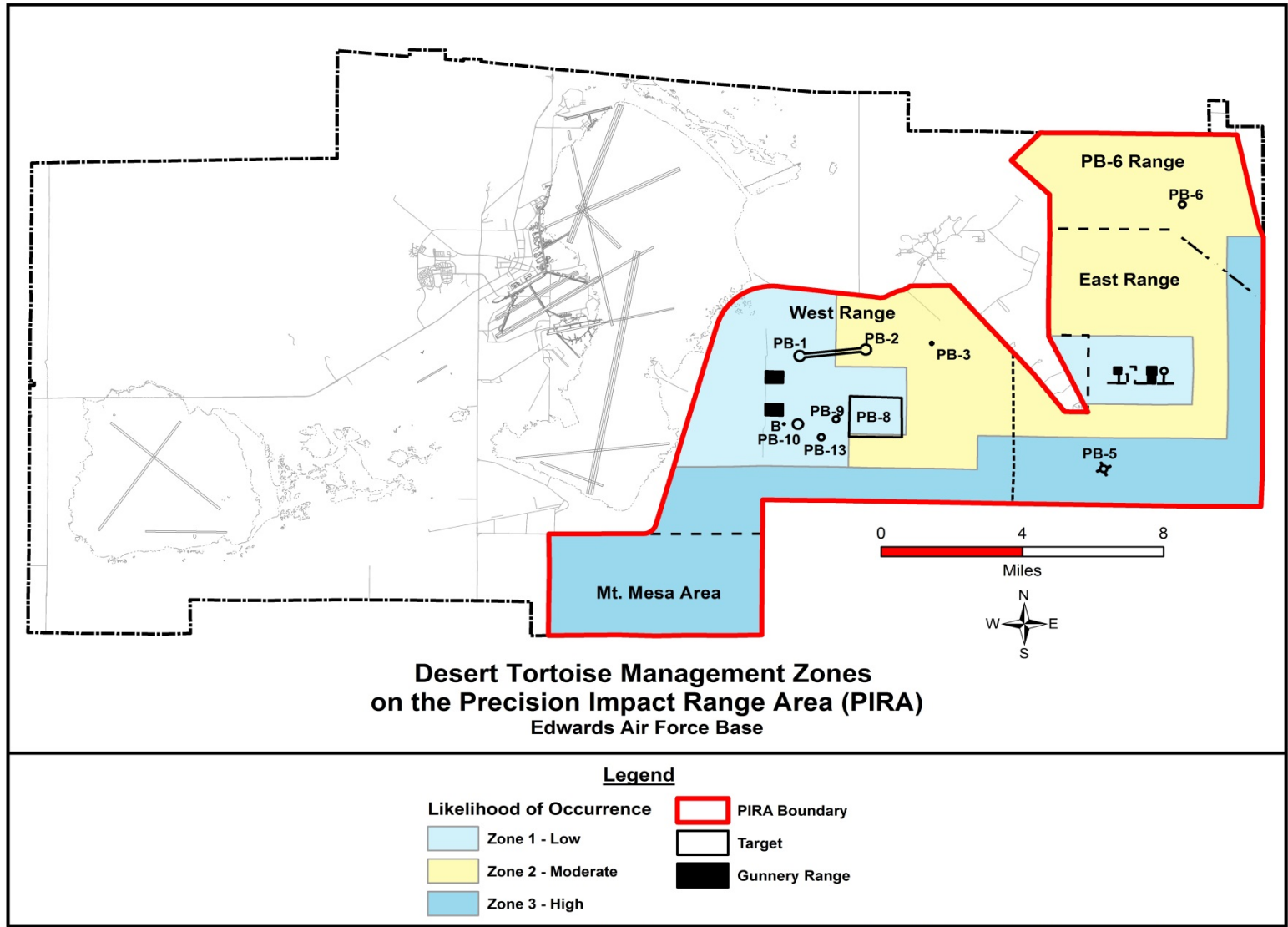


Figure 3-5 Desert Tortoise Management Zones on the PIRA

Table 3-3 Species of Interest on Edwards AFB

Species Common Name Scientific Name	Status	Occurs on Edwards	Habitat/Known Locations	Blooming Period
Alkali mariposa lily <i>Calochortus striatus</i>	CNPS 1B.2	O	Clay pans and sand dunes, drainages.	April - June
Desert cymopterus <i>Cymopterus deserticola</i>	CNPS 1B.2	O	Sandy soils.	March - May
Barstow woolly sunflower <i>Eriophyllum mohavense</i>	CNPS 1B.2	O	Loamy, gravel soils	March - May
Red Rock Poppy <i>Eschscholtzia minutiflora twisselmannii</i>	CNPS 1B.2	O.	Rare annual in Mojave desert scrub. Known from Rand and El Paso Mountains, one record on Edwards.	March - May
Crowned onion <i>Muilla coronata</i>	CNPS.2	E	Chenopod scrub, Joshua tree woodland, Mojave desert.	March - May
Slender nemacladus <i>Nemacladus gracilis</i>	CNPS.3	O	Sandy or gravelly substrate;.	March - May
White pygmy-poppy <i>Canbya candida</i>	CNPS.2	O	Gravelly, or granitic soil.	March - June
Golden goodmania	CNPS.2	O	Alkaline or clay soils within Mojave desert scrub, meadows and seeps, playas, and grasslands.	April - August
Sagebrush loeflingia <i>Loeflingia squarrosa</i> var. <i>artemisiarum</i>	CNPS 2.B.2	O	Desert sand dunes.	April - May
Lancaster milk-vetch <i>Astragalus preussii</i> var. <i>laxiflorus</i>	CNPS 1B.1	O	Areas of high water table in halophytic saltbush scrub, shadscale.	March - May
Rosamond eriastrum <i>Eriastrum rosamondense</i>	CNPS 1.B.1	O	David Gowen reported observation at southwest quadrant of West Avenue D and 30 th St West (May 2010). Alkaline hummocks, often sandy. Chenopod scrub and vernal pool openings.	April – July
Recurved larkspur <i>Delphinium recurvatum</i>	CNPS 1B.2	E	Alkaline soils, chenopod scrub, cismontane woodlands, and grasslands.	March - June
Popcorn-Flower <i>Plagiobothrys</i> sp.	CNPS 1.B.1	E	Parish's popcorn-flower presumed extirpated in area; unknown species of popcorn-flower found on Edwards.	March - November

WILDLIFE					
Species Common Name Scientific Name	Status	Occurs on Edwards	Seasonal Occurrence	Habitat/Known Locations	Breeding Season (Edwards Breeder's Only)
Reptiles and Amphibians					
Desert tortoise <i>Gopherus agassizii</i>	FT/ST	O	Resident	Throughout base.	N/A
Birds					
Bank Swallow <i>Riparia riparia</i>	ST	O	Migrant	Piute Ponds, Branch Pond	N/A
Burrowing owl <i>Athene cunicularia</i>	SSC/BCC	O	Breeding Season	Burrowing Owl Conservation Area and other locations throughout base.	Burrow Sites & some Wintering Sites
California Least Tern <i>Sternula antillarum browni</i>	FE/SE	O	Vagrant	Piute Ponds	N/A
Golden eagle <i>Aquila chrysaetos</i>	FP	O	Winter	Power Lines, Piute Ponds	N/A
Greater Sandhill Crane <i>Grus Canadensis tabida</i>	ST	O	Vagrant	Piute Ponds	N/A
Least bittern <i>Ixobrychus exilis</i>	SSC/BCC	O	Unknown	Piute Ponds	Nesting unknown
Loggerhead shrike <i>Lanius ludovicianus</i>	SSC/BCC	O	Resident	Throughout base.	Nesting unknown
Long-eared owl <i>Asio otus</i>	SSC	O	Resident	Mesquite woodlands.	Nesting
Northern harrier <i>Circus cyaneus</i>	SSC	O	Resident	Branch, Piute, Desert areas.	Nesting
Peregrine falcon <i>Falco peregrinus anatum</i>	FP/BCC	O	Vagrant	Piute Ponds	N/A
Prairie Falcon <i>Falco mexicanus</i>	BCC	O	Resident	Piute Ponds	Nesting unknown
Redhead <i>Aythya americana</i>	SSC	O	Resident	Piute Ponds	Nesting

Swainsons Hawk <i>Buteo swainsonii</i>	ST	O	Migrant	Various areas.	N/A
Tricolored blackbird <i>Agelaius tricolor</i>	SSC	O	Seasonal resident	Branch Pond, Piute Ponds	Nesting Colony
Willow Flycatcher <i>Epidonax traillii</i>	SE	O	Seasonal	Branch Pond, Piute Ponds	Nesting unknown
Mammals					
California mastiff bat <i>Eumops perotis californicus</i>	SSC	O	Migrant	Various areas.	N/A
Pallid bat <i>Antrozus pallidus</i>	SSC	O	Migrant	Various areas.	N/A
Townsend's big eared bat <i>Corynorhinus townsendii</i>	SSC	E	Unknown	Various areas.	N/A
Mohave ground squirrel <i>Xerospermophilus mohavensis</i>	ST	O	Resident	Various areas, PIRA.	N/A
American badger <i>Taxidea taxus</i>	SSC	O	Resident	Various areas throughout base.	N/A
Desert kit fox <i>Vulpes macrotis</i>	FP	O	Resident	Throughout base.	N/A

Occurs on Edwards: O – Observed; H – Historical occurrence with no recent sightings; E - Expected

Status: California Native Plant Society (CNPS) Status

List 1B–Plants of very limited distribution; global populations potentially threatened

.1 - Seriously endangered in California

.2 – Fairly endangered in California

.3 – Not very endangered in California

List 2–Rare, threatened, or endangered in California but more common elsewhere

List 4–Widespread and common; status does not warrant further consideration at this time

Federal Status

FE–Listed as federally endangered

FT–Listed as federally threatened

FPE–Federally proposed as endangered

BCC–Birds of Conservation Concern 2008. USFWS, Division of Migratory Bird Management

State Status

SE–Listed as state of California endangered

ST–Listed as state of California threatened

SSC–California species of special concern

California Department of Fish and Wildlife (CDFW)

SSC: Species of Special Concern; native species not having state or federal Threatened or Endangered Species status, but thought to warrant monitoring due to declining population numbers.

FP: Fully Protected: Fully Protected species state that these species "may not be taken or possessed at any time and no provision of this code or any other law shall be construed to authorize the issuance of permits or licenses to take any fully protected" species although take may be authorized for necessary scientific research

Sources:

- CNPS, Rare Plant Program. 2014. Inventory of Rare and Endangered Plants (online edition, v8-02). California Native Plant Society, Sacramento, CA. Website <http://www.rareplants.cnps.org> [accessed 02 May 2014].
- DFG (Department of Fish and Game). 2009. *Special Animals (883 taxa) July 2009*. State of California, The Natural Resources Agency, Department of Fish and Game, Biogeographic Data Branch, California Natural Diversity Database. <https://www.wildlife.ca.gov/>
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- Shuford, W.D., and Gardali, T., editors. 2008. *California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1*. Western field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento
- USFWS (U.S. Fish and Wildlife Service). 2008. Birds of Conservation Concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. Online version available at <http://www.fws.gov/migratorybirds>

There have been at least five species of bats documented as occurring on Edwards AFB, most of which are considered species of concern by the state. There are a few potential bat roosting and foraging areas throughout Edwards AFB, which include: hangars, abandoned buildings, rocky outcrops, test stands and/or small bodies of water such as sewage and golf course ponds (Brown-Berry et al. 1998). Bats have been recorded roosting in both occupied and unoccupied buildings, hangars and test stands, including a maternal colony in a building at Leuhman Ridge; they have been detected in nearly all parts of the base during past surveys (Brown-Berry et al. 1998). Edwards AFB is suspected to lie within the migratory path of several bat species, including Mexican free-tailed bat and has the potential to provide seasonal as well as permanent habitat for some species (Brown-Berry et al. 1998); however, the limited amount of available suitable roosting habitat may be the cause for a relatively limited distribution of bat fauna.

Common birds include the turkey vulture (*Cathartes aura*), common raven (*Corvus corax*), sage sparrow (*Amphispiza belli*), barn owl (*Tyto alba*), house finch (*Carpodacus mexicanus*), and western meadowlark (*Sturnella neglecta*). Joshua tree woodlands support cactus wren (*Campylorhynchus brunneicapillus*) and ladder-backed woodpecker (*Picoides scalaris*). Common bird species found in creosote scrub include the horned lark (*Eremophila alpestris*), black-throated sparrow (*Amphispiza bilineata*), and sage sparrow (*Amphispiza belli*). The seasonal inundation of lakebeds and claypans attracts wading bird species, including the black necked stilt (*Himantopus mexicanus*), American avocet (*Recurvirostra americana*), and greater yellowlegs (*Tringa melanoleuca*). Birds associated with ponds include the yellow-headed blackbird (*Xanthocephalus xanthocephalus*), black-crowned night heron (*Nycticorax nycticorax*), and green heron (*Butorides striatus*). Seasonal migratory birds use both permanent and temporary bodies of water for foraging on shrimp. These birds include ducks and geese such as the ruddy duck (*Oxyura jamaicensis*), northern mallard (*Anas platyrhynchos*), northern pintail (*Anas acuta*), Canada goose (*Branta canadensis*), and snow goose (*Chen caerulescens*). Ducks and geese are hunted in designated areas on Base. For a list of birds 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) and *Bird Studies 2000-2005: Summary of Field, Radar, and Geospatial Analyses of Bird Populations on Edwards Air Force Base, California* (AMEC Earth and Environmental, 2006).

Amphibians identified on Base at Piute Ponds include western toad (*Bufo boreas*), Pacific tree frog (*Hyla regilla*), red-spotted toad (*Bufo punctatus*), and African clawed frog (*Xenopus laevis*). Common reptiles on Base include the desert spiny lizard (*Sceloporus magister*), side-blotched lizard (*Uta stansburiana*), western whiptail (*Cnemidophorus tigris*), zebra-tailed lizard (*Callisaurus draconoides*), glossy snake (*Arizona elegans*), coachwhip (*Masticophis flagellum*), gopher snake (*Pituophis melano leucus*), and the Mojave green rattlesnake (*Crotalus scutulatus*). For a list of reptiles and amphibians 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).

California ground squirrels (*Spermophilus beecheyi*) are considered a nuisance on Edwards AFB. Their populations have been increasing in the developed areas and are responsible for damage to landscaped areas caused by their digging and burrowing activities. Sometimes they find their way into inhabited homes and other buildings/facilities causing

widespread damage to the interior of buildings. Edwards AFB attempts to control their populations with various methods detailed in the Programmatic Environmental Assessment for the Control of Ground Squirrels in Military Family Housing and Other Industrial Areas of Edwards Air Force Base, California (AFFTC, 1996a).

3.5.2 Plant Species

The following is not a complete list of the Edwards AFB floral species. For a complete list of plant species at Edwards AFB, see the 2008 INRMP or *Plant Species at Edwards Air Force Base* (Charlton 1994). Creosote bush scrub is dominated by creosote bush (*Larrea divaricata*). At Edwards AFB, there are approximately 103,000 acres of creosote bush scrub, which comprises approximately 34 percent of the area of the Base. Common species found in this community include winterfat (*Ceratoides lanata*), cheesebush (*Hymenoclea salsola*), and Nevada tea (*Ephedra nevadensis*).

Joshua tree woodland is dominated by Joshua trees (*Yucca brevifolia*). At Edwards AFB, there are approximately 52,800 acres of Joshua tree woodland that comprise approximately 17 percent of the area of the Base. Typically, Joshua tree woodland understories include saltbush and creosote bush habitats. Common species found in this community include creosote bush, saltbush species, the native desert dandelion (*Malacothrix glabrata*), pincushion (*Chaenactis sp.*), and fiddleneck (*Amsinckia tessellata*).

Halophytic phase saltbush scrub is dominated by four species of the genus *Atriplex*: spinescale (*A. spinifera*), shadscale (*A. confertifolia*), four-wing saltbush (*A. canescens*), and quailbush (*A. lentiformes*). At Edwards AFB, there are approximately 55,300 acres of Halophytic phase saltbush scrub, which comprises approximately 18 percent of the area of the Base. A common species found in this community includes saltgrass (*Distichlis spicata*).

Xerophytic phase saltbush scrub is dominated by allscale (*Atriplex polycarpa*). At Edwards AFB, there are approximately 45,300 acres of arid phase saltbush scrub which comprises approximately 15 percent of the area of the Base. Common species found in this community include burrobrush (*Ambrosia dumosa*), goldenhead (*Acamptopappas sphaerocephalus*), and cheesebush (*Hymenoclea salsola*).

See Table 4 for the list of plants and habitats of interest found on Edwards AFB; the table summarizes the concerns associated with them. Appendix A, Figure 5-3 in the INRMP shows the general locations of species of interest on Edwards AFB.

The *Los Angeles County General Plan* established 61 Significant Ecological Areas (SEAs) that represent a wide variety of biological communities within the County. These areas have special management concerns.

The current *Los Angeles County General Plan* (1980) identified two SEAs on the Base, Edwards Air Force Base (SEA 47) and Rosamond Lake (SEA 50). Significant Ecological Area 47 contains botanical features that are unique and limited in 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 an example of the shadscale scrub and alkali sink biotic communities in Los Angeles County and encompasses 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.

Los Angeles County revised the general plan in 2012 as a draft and is now working on a draft component plan for 2035; in this draft plan, SEA 47 and 50 are combined under the Antelope Valley SEA (<http://planning.lacounty.gov/sea/biological>).

3.5.3 Floodplains

Floodplains, as defined by Executive Order 11988 *Floodplain Management*, and AFI 32-7064 are lowland and relatively flat areas adjoining inland and coastal waters including flood prone areas of offshore islands, including at a minimum, that area subject to a one percent or greater chance of flooding in any given year. Floodplains have been delineated both from a geomorphological and channel geometry standpoint (French, et al., 2009) (Meyer, et al., 2002). Information obtained has documented the elevations expected to be reached on the individual lakebeds and where the expected flood prone areas are (Figure 3-6). The flood prone areas include washes and clay pans adjacent to and connecting the lakebeds, such as those between Rosamond Dry Lake and Buckhorn Dry Lake and the areas between Buckhorn Dry Lake and Rogers Dry Lake.

Rosamond Dry Lake and Rogers Dry Lake are inundated with natural storm flow during wet winters. The Rogers Dry Lake drainage pattern is toward the southern end of the lake. Portions of the lakebed can remain inundated until late summer due to the low permeability of the lakebed soils and slow evaporation rate if sufficient surface flow is received. Water on the lakebed contains suspended sediment scoured from beds and banks of channels and tributary to Rogers Dry Lake and from erosion of the lakebed surface (Blodgett, et al., 1992). For both lakebeds, suspended sediment is generated by erosion of the lakebed when the wind causes small waves. The sediment helps fill surface irregularities when the suspended material is deposited on the lakebed as water evaporates. Inundation combined with wind moves sediment across the playa, filling surface cracking and fissures. A study of the geomorphology of the dry lakebeds concluded that periodic flooding of the playas was critical for maintenance of smooth, hard pavement or lakebed surface and appears to be a prerequisite for maintaining a hard, compact lakebed surface (Motts, 1970).

Desert Research Institute (DRI) conducted a flood plain assessment for Rogers Dry Lake focusing on the identification of the regulatory 100-year floodplain, titled, *Flood Assessment for Rogers Dry Lake, Edwards Air Force Base, California* (French and Miller, 2003). Based on the DRI study, the regulatory 100-year floodplain elevation boundary is 2,277.5 feet at a depth of 2.3 feet.

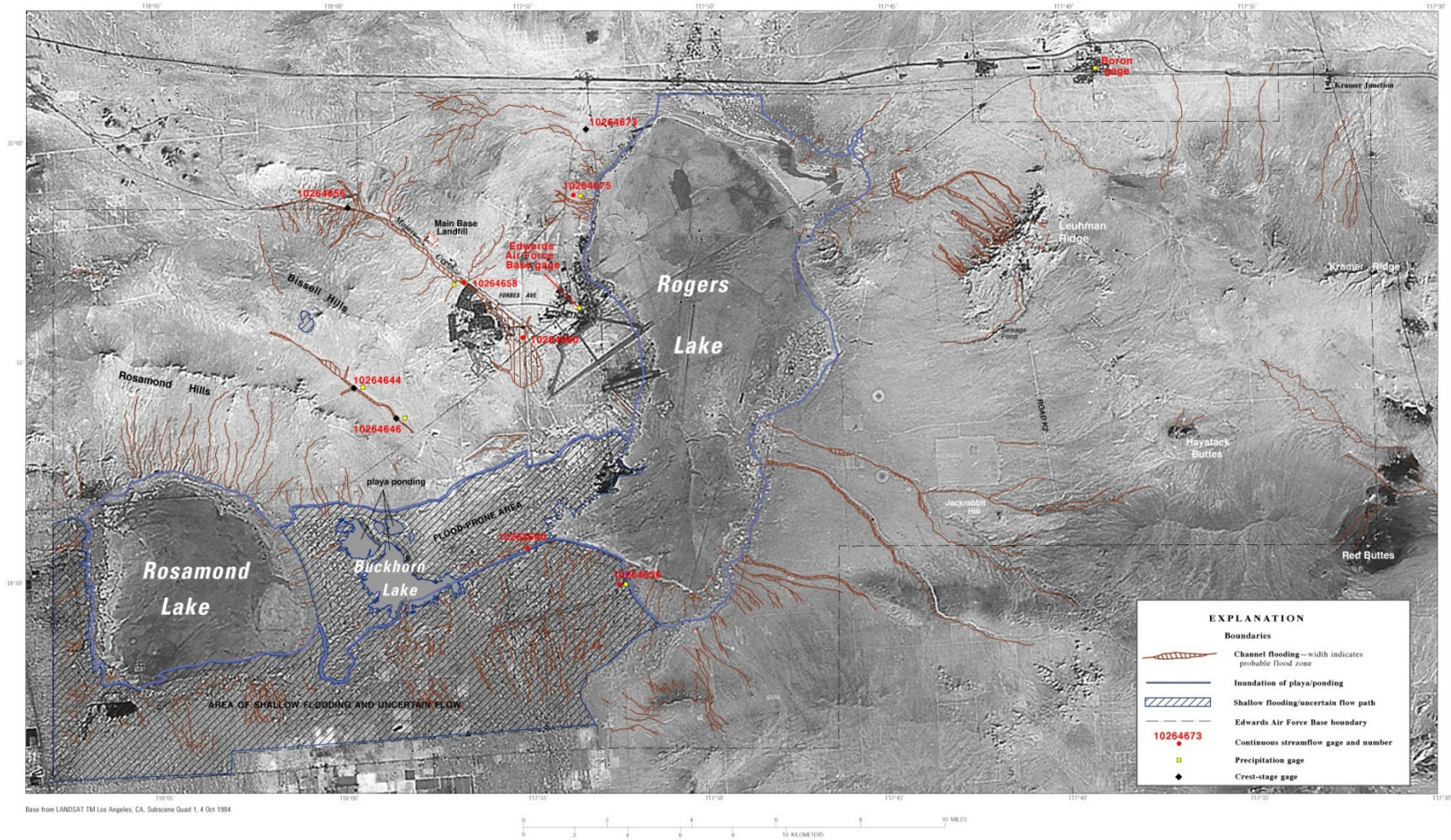


Figure 3-6 Floodplain Boundaries

3.6 Cultural Resources

Cultural resources are defined by AFI 32-7065, *Cultural Resources Management Program*, 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 historic period structures and objects), and traditional cultural places. 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 compass rose, which is located in the northern portion of Rogers Dry Lake.

Of the 307,517 acres of land managed by Edwards AFB, 207,000 acres (68 percent) have been surveyed through fiscal year 2014, to provide the following findings:

- 5,034 sites have been identified.
 - 1,342 found ineligible.
 - 3,692 found eligible to the NRHP or, as yet, unevaluated.
 - 1,601 are prehistoric.
 - 2,091 are historic.

Architectural Resources

Of the 3,035 facilities listed in Edwards AFB Real Property (included in the Automated Civil Engineering System) that are tracked by Cultural Resources, 796 have been evaluated through fiscal year 2011, with the following results:

- 1,030 do not require any further assessment, as they are infrastructure elements.
- 829 have been determined ineligible.
- 23 have been determined individually NRHP-eligible.
 - 13 are at the Main Base.
 - 4 are at North Base.
 - 6 are at Air Force Research Laboratory (AFRL).
- 96 are eligible as contributing elements to proposed historic districts. This count does not include facilities found individually eligible, previously accounted for in this list.
 - 40 contribute to the proposed AFRL historic district.
 - 6 contribute to the proposed X-15 historic district.
 - 49 contribute to the proposed Jet Propulsion Laboratory historic district.
 - 1 contributes to the proposed Power Plant Branch historic district.
- 1,209 have not been assessed.
 - 10 will be 50 years or older by 2016 and need to be assessed.

- 1,155 were constructed after 1960 and will be assessed when they reach 50 years of age, or if it is otherwise determined necessary to assess them (95th Air Base Wing, 2012).

Traditional Cultural Properties and Sacred Sites

Edwards AFB consults with American Indian tribes to deal with issues concerning the Native American Graves Protection Repatriation Act of 1990 (NAGPRA). Under Section 106, Edwards AFB is also aware of the importance of traditional cultural places and sacred sites, and an effort to identify those that require American Indian consultation has been completed. Five sacred sites have been identified by an American Indian tribe (95th Air Base Wing, 2012).

Collections

As of the end of fiscal year 2014, cultural resource investigations occurring at Edwards AFB have resulted in the storage of approximately 1,520 cubic feet of materials at the on-base Curation facility. The materials include artifacts, associated documentation, reports, oral history transcripts and tapes and photographs (Curation Record).

Prehistoric period sites include villages, temporary camps, rock shelters, milling stations, lithic deposits, quarries, cremations, rock features, and rock art (ICRMP, 2012).

3.7 Soils

Geologic resources consist of naturally-occurring igneous and volcanic rocks and associated unconsolidated sediments consisting largely of alluvial and wind-deposited sand overlying shallow bedrock or several hundred feet of ancient sand, silt and clay lakebed deposits. Soil refers to the uppermost layers of surficial geologic deposits and is developed by the weathering of those deposits. The United States Department of Agriculture Natural Resources Conservation Service prepared a *Soil Survey of Edwards Air Force Base, California* (USDA, NRCS, 1996 and 1997). The developed areas of the Base have loams, sandy loams or loamy sands. Some soils have a silt or clay component especially around the lakebeds where clay predominates. All soils at Edwards AFB have low organic carbon content. The soil survey reveals that the erosion hazard rating for soils found in the area range from slight to severe for wind erosion and none to moderate for water erosion. The soil survey also noted the possibility of erosion is increased if the soil is left exposed during site construction or demolition. Desert soils often have a thin biotic crust that prevents erosion and takes up to hundreds of years to recover after removal by grading. A discussion of air quality concerns associated with wind erosion can be found in Section 3.2, Air Quality.

3.8 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, the boundary of the socioeconomic environment is defined by those counties, or portions of counties, in which the proposed action will occur. The economic impact region includes all areas within this boundary. The economic impact region 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 economic impact region 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 3-7).

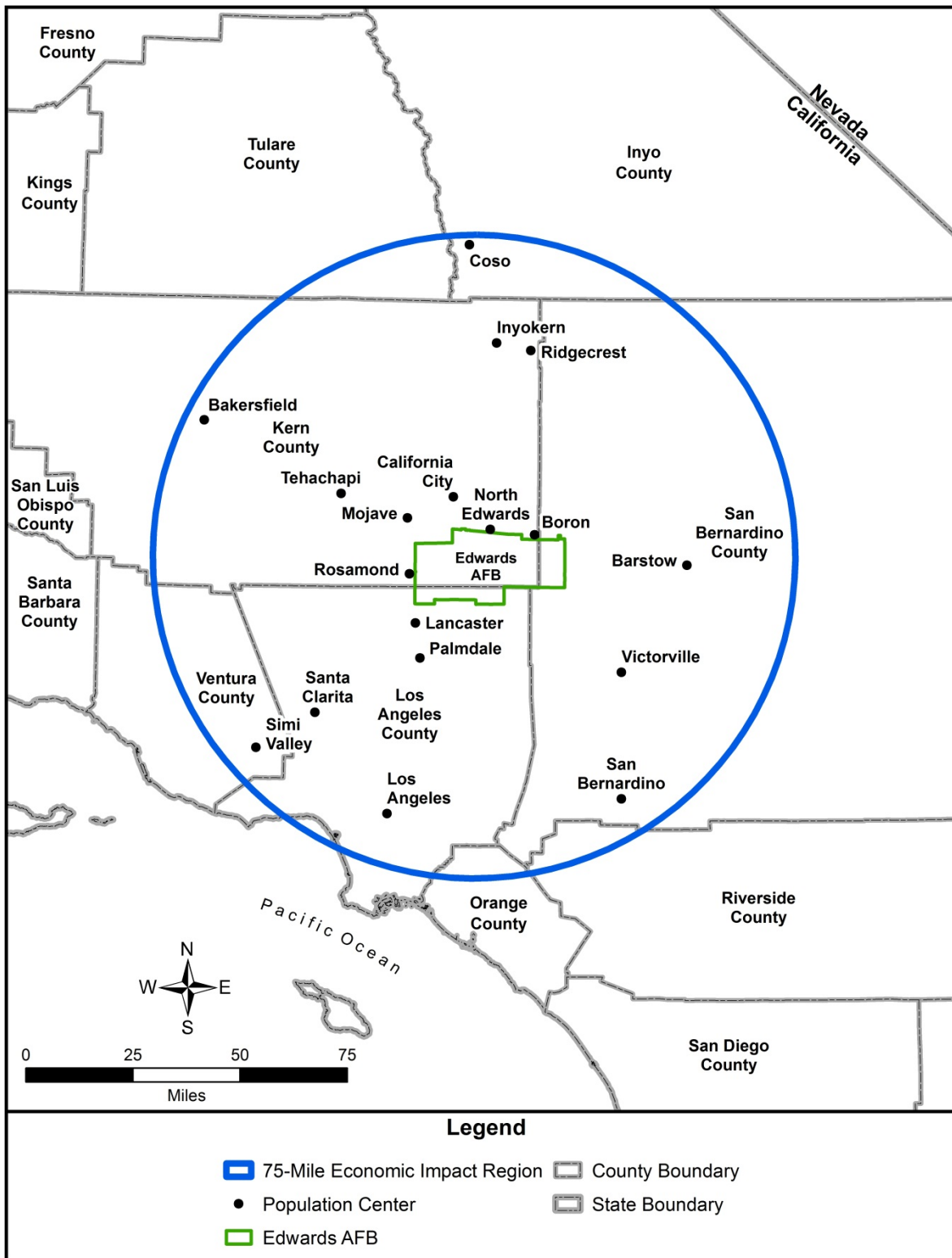
Social institutions², defined ways of life³, and the availability of recreation activities all influence the way individuals and communities view their quality of life.

3.8.1 Fiscal Growth

Edwards AFB is one of the largest employers in the Antelope Valley with a daily workforce of 10,420 and an annual economic impact of \$1.44 billion (Edwards Air Force Base Economic Impact Analysis Fiscal Year 2013). Edwards AFB's personnel and local contracts indirectly created jobs in the local area and boosted the local economy. In 2013, Edwards AFB added approximately 12,224 indirect jobs to the Antelope Valley. The local contracts relevant to the proposed alternatives in this EA include Operations & Maintenance and Service.

² Social institutions encompass educational, family, economic, military, religious, and recreational/leisure.

³ Defined ways of life encompass subsistence hunting and fishing, stability and change, cohesion and conflict, and community identity.



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Figure 3-7 Economic Impact Region Map

3.9 Recreation and Quality of Life

Edwards AFB provides a variety of programs, services, and recreation activities to enhance the quality of life of its military members and their families. These include the Aero Club, Skill Development Center, Outdoor Recreation, Equipment Checkout, bowling center, golf course, riding stables, Rod and Gun Program (CAR), Oasis Aquatic Center, Tickets and Tours, Family Camp, Sports and Fitness Center, Aerobics Center, Community Activity Center, Child Development Center, Youth Center, hunting/fishing areas, Desert Wheels Motorcycle Club, and ORV areas.

Natural resource management, in coordination with Services Division, primarily manages the Hunting and Fishing Program. Services Division is responsible for collecting funds generated by the Hunting and Fishing Program. Other outdoor recreation program activities are primarily managed through the Services Division.

Hunting. The CDFW regulations are applied on base and may be further limited by base rules. Information on hunting and fishing is periodically published in the Base newspaper, and is also provided through the Hunters' Hotline or Security Forces. Environmental Management is responsible for consulting with the USFWS and CDFW to ensure compliance with appropriate federal and state laws. Environmental Management conducts checks of waterfowl bag limits and hunting licenses throughout the hunting season. In addition, Environmental Management is responsible for tracking and managing the funds in the Fish and Wildlife Conservation Account.

Flight Operations is responsible for providing information to Environmental Management on low-altitude aircraft missions to help prevent conflicts with hunting activities.

Fishing. Fishing is available to active duty, retired military members, and their dependents, other Federal and contractor employees assigned to the Base and their dependents; and sponsored guests. Fishing is allowed only in Branch Memorial Park Pond year-round, from dawn to midnight, except when the pond is temporarily closed (generally for fish stocking).

Off-Road Vehicle Area. Off-Road Vehicle Area 1 (approximately 100 acres in size) is for the use of the Desert Wheels Motorcycle Club only. Off-Road Vehicle Area 2 is 15,040 acres, and is jointly used for equestrian, ORV, and general recreational use. ORV Area 3 (about 4,328 acres with 32 miles of trails), located just north and northwest of NASA/Armstrong, and primarily west of Rosamond Boulevard, is only used for non-motorized mountain biking and jogging. All off-road vehicles must be registered with the State and operated only within designated trails in ORV areas. Signs are placed in the at least every 1/2-mile along the boundary of the ORV area. Bulletin boards are placed in at least two main access areas providing rules and safety information. Edwards AFB requires all riders of motorized vehicles to carry proof of training and receive desert tortoise awareness training.

Camping. Overnight camping areas are available on Base. The Family Campground (Fam Camp) is for the use of active-duty and retired military, DoD contractor, and civilian personnel, and their dependents and guests. Branch Memorial Park is also a designated campground; camping is limited to the grass landscaped portions of the park. Camping is also authorized in a designated location at Piute Ponds for use by hunters during the waterfowl season.

Riding Stables. Equestrian facilities consist of 50 stables (capacity for 100 horses), an exercise and training area, and a large open riding area; equestrians can also use ORV Area 2.

Golf Course. The Muroc Golf Club, an 18-hole golf course and driving range, is located within the Military Family Housing (MFH) Area.

Other recreation programs. Jogging, par course, hiking, and bicycle trails are located within the Main Base and MFH areas as well as within ORV Area 2. Picnicking and ball fields are also located within these areas and at designated recreational areas such as Branch Memorial Park. Model airplane use may be permitted on the north side of Rosamond Dry Lakebed.

Ecological recreational and education opportunities exist at Piute Ponds. Group tours and individual viewings are made by bird watchers and naturalists after coordination with Natural Resource Management; these activities must be approved by the Base Commander. Bird watchers and other naturalists conduct group tours and individual viewings after coordination with the Environmental Management Division. Archeological and historic sites on Base also provide educational opportunities. These areas are periodically patrolled by Security Police to guard against vandalism.

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4.0 ENVIRONMENTAL CONSEQUENCES

This section of the document evaluates known, potential, and reasonably foreseeable environmental consequences related to the development and implementation of an INRMP at Edwards AFB. General overall impacts to these resources are also discussed, including the impacts of the No Action Alternative or low level of active management plan). In addition to impacts in the United States (July 1, 1997) guidance from CEQ, agencies “must include an analysis of reasonably foreseeable 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.

The *Sikes Act* requires an INRMP to provide goals and objectives for managing natural resources including a course of action designed to improve the management of natural resources at Edwards AFB. An INRMP allows flexibility in management options as more information becomes available from ongoing monitoring and planned studies. The impacts identified in this analysis range from no impact to either beneficial or minor adverse impacts. An INRMP 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 natural resources goals and objectives. The specific goals may be found in the INRMP. The selected alternative plan will be reviewed and, if necessary, updated and coordinated annually with the federal and state resource agencies, and updated every 5 years should a major revision be required. Additional environmental analyses may be required as new management decisions are determined and new, adaptive management strategies are developed and incorporated into the Plan. All of the alternatives considered would be compatible with the current *General Plan for Edwards Air Force Base California* (2013).

Effectiveness/compliance monitoring is considered an essential part of all of the action alternatives. Without effectiveness monitoring, it is not possible to have a science-based adaptive management program. Adaptive management relies on the ability to accurately determine what is and is not working, and initiating changes in management practices through time. The ultimate goal is to enhance and maintain ecosystem biodiversity.

4.1 Land Use

4.1.1 Alternative A Impacts

The Edwards AFB targeted management plan provides an overall guide for land use as it relates to natural resource management. The objectives of the plan are to ensure conservation of the land by adopting land-use practices based upon sustaining the ecosystem to maintain training areas through the preservation of natural terrain and vegetation. The long-term monitoring program takes into account all restoration and natural resource projects to ensure their successful completion. From the perspective of land use, implementation of Alternative A would result in maintaining habitat conditions for the flora and fauna and is expected to maintain the natural level of species diversity.

Establishing a MOA with Los Angeles County Sanitation District (LACSD) (D-14) and Ducks Unlimited (DU) would not change the land use within the boundary of the Piute Ponds Complex. This MOA is expected to result in fulfilling common goals by agreeing to work together in support of the management of Piute Ponds pursuant to the Sikes Act, Title 16, Chapter 5C, Subchapter I 670, and the Edwards AFB INRMP, Piute Ponds Management Plan (a component plan of the INRMP), and IAW the LACSD Environmental Impact Report (2004). The ultimate goal is to implement long term management, operation and maintenance of the Piute Ponds Complex, and ensure the health of the surface of Rosamond Dry Lake. The overflow of tertiary treated waste water on Rosamond Dry Lake is expected to maintain a smooth lakebed surface for mission operations. D-14's supply of treated waste water to the Piute Ponds Complex would result in sustaining the wetlands functions and wildlife values within the Piute Ponds Complex in support of breeding habitat and a stopover for migratory birds.

The Piute Ponds Management Plan, a component plan of the INRMP, and subsequent water management strategies benefit the Piute Ponds Complex by ensuring the infrastructure (e.g., roads, weirs, and dikes) is well maintained to carry out the adaptive management of the area and does not change the existing land use of the area.

This alternative has an extremely limited potential for adverse impacts because management actions provide an overall benefit with minimal modifications to land use as described above. All conservation projects would require NEPA review and analysis prior to implementation.

4.1.2 Alternative B Impacts

Acquiring conservation easements through the purchase of lands under the Readiness and Environmental Protection Initiative (REPI) program will not alter the existing land use, but will maintain habitat continuity and diversity outside the base boundary and under designated aircraft flight corridors. Encroachment on the base boundary would be significantly reduced to ensure the base does not become an island refuge for wildlife species.

Alternative B would implement more land use projects than Alternatives A and C. Alternative B would have the same general goals and objectives as the other alternatives but would take more time to complete and require additional manpower and funding (restoration projects). Active habitat restoration and manipulation of plant succession in the open desert will enhance the land by reintroducing native plant species to recover the habitat from past disturbance.

Road closure projects would involve using barriers (e.g., rocks and vegetation) and minimal translocation and planting of shrubs to camouflage access roads in remote areas. The existing land use would be modified to eliminate the use of a road and would be expected to increase the diversity of the habitat.

The use of fire as a management tool is limited under this alternative to burning wetland vegetation in Branch Park Pond and at Piute Ponds. This effort will be coordinated with and supported by the base fire department. This management strategy is expected to produce positive impacts by eliminating dried out and dense vegetation, thus enhancing the aquatic habitat by creating open areas for wildlife use (e.g., feeding, breeding, and raising of young).

Fire would enhance natural conditions at Branch Park Pond and Piute Ponds and not alter the overall land use of the area.

While the activity level would be higher, no significant adverse impacts would be expected because these projects would be designed to protect, preserve, and enhance the existing land. All conservation projects would require NEPA review and analysis before implementation.

4.1.3 Alternative C Impacts

Under Alternative C, general land management use at Edwards AFB would be minimally managed under current conditions but in IAW all applicable laws and regulations. The following management activities that would result in land disturbance and a change in land use would include installing desert tortoise exclusion fence and warning signs, installing and maintaining wildlife guzzlers, and replacing bat habitat by constructing alternative bat roosts.

Installation/maintenance of desert tortoise exclusion fence and warning signs do result in minor changes to land use by installing the fence and warning signs of tortoises in the area along well-traveled roads. These actions benefit the tortoise by keeping it from accessing well-traveled roads where it could be hit by a vehicle; the warning signs let drivers of vehicles know there are tortoises in the areas and to keep watching out for them on the roads. However, in most cases, desert tortoise exclusion fence is installed at the bottom of an existing chain-link or barb wire fence and does not alter land use. The natural resources of the Base would be marginally maintained by the limitations of the types of projects that would be implemented under this alternative.

There are 19 fiberglass wildlife guzzlers already installed in various locations on base for chukar, quail, and other wildlife. The guzzler captures and holds rain water for wildlife. Installation of up to 7 new fiberglass wildlife guzzlers involves a minimal amount of ground disturbance of approximately 25 square feet (including digging out a ditch to a depth of 4 feet with a small bobcat construction vehicle) and creation of an apron (about 300 square feet) leading to the guzzler. Shrubs would be avoided to the maximum extent and the area of disturbance is primarily limited to open areas. Approximately 24 guzzlers would be maintained on an annual basis, and at times, supplemental water would be supplied to the guzzler during periods of drought. This small amount of land disturbance for an additional 7 guzzlers is extremely limited and is not expected to be an adverse effect to modifications of the existing land use, especially since 19 have been installed and maintained for many years within the base landscape.

Alternative bat houses would be considered should maternity bat roosts occur in abandoned buildings scheduled for demolition. This would not result in an adverse effect to bats because maternity roost sites would be replaced with suitable bat houses.

4.1.4 Noise (Annoyance)

4.1.4.1 Alternative A Impacts

Natural resource projects supporting the BASH program and surveys and management of migratory birds along the flightline and in hangars are likely to expose project personnel to jet engine aircraft noise levels greater than 75 dBA (decibel, A-weighted). Project personnel would

adhere to hearing protection guidelines which would substantially decrease any adverse effects of hearing loss.

To prevent potentially harmful effects to Air Force and civilian personnel from exposure to hazardous noise, with respect to operation of heavy construction equipment and vehicles and surveys conducted within the boundary of the flightline areas, the USAF established a hazardous noise program under AFOSH Standard 48-20, Occupational Noise and Hearing Conservation Program. As such, workers are required to follow AFOSH Standard 48-20 and Federal OSHA. Non-DoD civilian personnel working on the installation are exempt from AFOSH Standard 48-20, but must comply with applicable Federal and State regulations.

4.1.4.2 Alternative B Impacts

There would be an expected increase in noise by the type and amount of equipment used in habitat restoration/enhancement and other land disturbance projects. These vehicles may include tractors, backhoes, bulldozers, trackhoes, and bobcats. Typical engine noise generated by such vehicles performing natural resource management activities in remote areas would be expected to be comparable to that of a tractor or other farm equipment. Expected noise levels would originate at remote areas where such vehicles would be operating (more than a few miles from developed areas) on base; therefore, no adverse effects would be expected to base personnel.

Using mechanical means (e.g., bulldozers and backhoes) to remove vegetation at remote areas of Piute Ponds would not generate noise levels that would negatively impact base personnel due to the remoteness of the activity (miles from any base developed areas). Natural resource management activities are not likely to expose project people to noise levels exceeding OSHA standards because they are required to use appropriate hearing protection (as required by Cal OSHA when operating noisy equipment).

A high level of natural resource management activity has the potential to produce minimal noise impacts from expected projects (i.e., exotic species removal, weed removal, restoration and habitat enhancement projects, and other minimal ground disturbing management practices). Due to the remote location of these projects, impacts to humans are not anticipated. Natural resource management activities are not likely to expose project people to noise levels exceeding OSHA standards because they are required to use appropriate hearing protection (as required by Cal OSHA when operating noisy equipment).

4.1.4.3 Alternative C Impacts

Under Alternative C, the current natural resource management practices involving installation of tortoise fence and installing tortoise warning signs would result in substantially less noise impacts than described for Alternatives A and B. This is reflected by the remote areas where such activities would occur as well as the types of equipment used such as a tool used to dig post holes and small trencher to install tortoise fence. This minimal noise level would not affect the overall noise levels at Edwards AFB and is not considered an adverse effect to base personnel or project personnel.

While this alternative produces the least amount of noise impacts, it is also the least likely to successfully accomplish the natural resource management goals and objectives. Noise impacts

from exotic species removal and habitat restoration would be extremely minor under this alternative and produce substantially less noise impacts than discussed under Alternative A or Alternative B.

4.2 Air Quality

A CAA Conformity determination has been done for all of the alternatives, which assumes all pesticides and herbicides used convert 100 percent into VOCs, which includes prescribed burns of wetland vegetation at Branch Pond and Piute Ponds. Under Alternative B, a 10-percent increase in equipment use (vehicles and other equipment) is expected, contributing to insignificant increases in NO_x and VOCs. The CAA Conformity determination illustrates project activities under the preferred alternative are below the Conformity Applicability Thresholds for EKAPCD, AVAQMD, and MDAQMD. A CAA Conformity Statement is on file at the Environmental Management Office.

4.2.1 Alternative A Impacts

The major concerns regarding the air quality and potential environmental effects pertain to increases in pollutant emissions exceeding NAAQS and other Federal, State, and local limits, and impacts on existing air permits. Historically, there has been an occasional use of pesticides (VOCs), but aerial spraying has not been done, and is not expected to be. Mobile pollution sources associated with natural resource management activities are primarily vehicles and equipment (NO_x) used for surveying and project-specific restoration and management projects. This alternative would allow primarily natural reseeding of historically disturbed areas. Natural reseeding is typically a slow process and has a higher potential to develop “blowout areas” which could degrade air quality (PM₁₀). There would, however, be fewer pesticides used, and therefore, few VOC emissions related to pesticide use under this alternative.

Natural wind erosion is probably the largest contributor to air pollution on and around the Base. No effects would be expected under the No Action Alternative, because no changes to current practices would occur. Currently, emissions from the natural resource management activities being used at Edwards AFB are minimal and do not exceed any thresholds that would require an air quality permit. Therefore, there would be extremely minimal effects regarding air quality as a result of implementing the No Action Alternative. Measures (a) through (m) in Section 4.2.2 shall be implemented when conducting any ground disturbing activities due to current management activities.

4.2.2 Alternative B Impacts

Active management of the natural resources on Edwards AFB would include an increase in management intensity. An increase in the active control of exotic species would probably include increased use of pesticides (VOCs) as well as ground-disturbing methods of pest control, manual and mechanical (NO_x). Both have the potential to degrade air quality through increased VOC emissions and increased potential for PM₁₀ due to the prevailing winds. The VOC emissions would not be expected to exceed any NAAQS standards because they would only be used in accordance with the approved policy. The long-term monitoring program would be

expected to monitor any potential land-disturbing actions, and if necessary, to develop restoration projects to control potential soil erosion due to wind.

Increased active management of the natural resources on Edwards AFB would also generate criteria pollutants, ozone precursors and hazardous air pollutants from heavy equipment engine exhaust, soil disturbances and unpaved road traffic. Considering the small numbers of heavy equipment and crew required for the proposed management actions and the fact that low emissions would be spread over a period of a year for five years, the potential impacts of engine exhaust on ambient air quality are anticipated to be *de minimis*. Fugitive dust emissions (PM_{2.5} and PM₁₀) are of concern for most ground-disturbing activities (grading, clearing of areas, road closures, installing desert tortoise exclusion fence, prescribed burns of wetland vegetation, etc.), because emissions are released near the ground without any plume rise induced by buoyancy and/or vertical momentum. However, the fugitive dust emissions from ground-disturbing activities would not likely exceed the NAAQS or CAAQS. Standard best management practices for ground-disturbance, including dust suppression, would reduce impacts to air quality.

Emissions due to high level management action for natural resource projects, including prescribed burns, were calculated under the assumption that Alternative B represents the worst case scenario for air emissions (Appendix C). Since the air emissions (including burns) are *de minimis*, no impacts to surrounding communities are expected to occur. Table 4-1 presents a summary of emissions for 2015, a typical year. Detailed calculations are included in Appendix C. As shown in the table, the estimate emissions are well below Significance Thresholds discussed in Section 3.2.5. The associated HAP emissions would be minimal.

Table 4-1 Emissions Estimates for FY 2015

Pollutant	Emissions from Vehicle Exhaust (ton/yr)	Emissions from Wood Combustion (tpy)	Total (tpy)
VOC	0.1	9	9.1
CO	0.7	25	25.7
NOX	0.3	0	0.3
SOX	0.0	0	0
PM10	0.0	3	3
GHG	107.5	415	522.5

General Conformity Applicability Analysis

For the Alternative B, a General Conformity Applicability Analysis was accomplished in accordance with 40 CFR Subpart B 93.153. Section (c)(1) specifies that the requirements of this subpart shall not apply to Federal actions where the total of direct and indirect emissions are at or below the emissions levels (*de minimis* thresholds), which were previously specified for NOx and VOCs as precursors to ozone generation. Total direct and indirect air emissions for Alternative B are presented in Table 4-2.

Table 4-2. Total Emissions in Tons per Year

Total Emissions (ton/yr)							
Location	ROG	CO	NO_x	SO_x	PM10	PM2.5	CO₂
Guzzlers	0	0	0	0	0	0	0
General Use & All Projects	0.1	0.7	0.2	0.0	0.0	0.0	88.9
Branch Pond (EKAPCD)	1	2	0	0	2	1	39
Piute Ponds (AVAQMD)	8	23	0	0	13	5	395
Total	9	26	0	0	15	6	523
Conformity Applicability Threshold for EKAPCD	100	N/A	100	N/A	100	100	25000
Conformity Applicability Threshold for AVAQMD and MDAQMD	25	N/A	25	N/A	15	15	10000

The table clearly shows that, even with a conservative estimation, the applicable ozone precursor emissions are well below the conformity threshold levels specified for the EKAPCD Ozone non-attainment area (100 tons per year for both NO_x and VOCs) and the MDAQMD and AVAQMD Ozone non-attainment areas (25 tons per year for both NO_x and VOCs). Therefore, the project activities described in Chapter 2 would not exceed the *threshold* levels for the criteria pollutants in nonattainment status as documented by the Air Quality Calculations in Appendix C. Thus a conformity determination is not required for the proposed action or alternatives. The Record of Non-applicability is also included in Appendix B.

The proposed management actions will comply with all applicable federal, state and local laws and regulations and a General Conformity Determination for Alternative B is not applicable. Compliance with the minimization measures listed in Section 4.2.2 will further reduce anticipated effects due to criteria pollutant or ozone precursor pollutant air emissions. Therefore, no significant adverse effects are expected.

HAP emissions would be short-term, occurring only during ground-disturbing activities. It is anticipated that the construction equipment would be in compliance with all applicable California Diesel Regulations for off-road and on-road vehicles, which are aimed at reducing diesel particulate as well as NO_x emissions, by requiring the use of cleaner engines. Compliance with all CAA Title III, HAP requirements or more stringent state or local requirements, as they apply to stationary sources that emit HAPs, would also be required. For Edwards AFB, the total HAP emissions were 4.352 tons in 2009. Consequently, no adverse HAP-related impacts are expected from the proposed activities.

The following minimization measures are required to reduce any potential air quality impacts to less than significant levels:

a. Project activities shall comply with all applicable rules and regulations as identified in AFI 32-7040, *Air Quality Compliance and Resource Management* (2007).

b. The project shall comply with all applicable EKAPCD, MDAQMD or AVAQMD rules and regulations and obtain the necessary air quality permits. Emissions from permitted devices and activities must be tracked and reported to the CARB, the appropriate air district and the U.S. EPA. Air quality permits, if required, shall be coordinated through the Environmental Management Division. The Environmental Management Division is the lead agency for the application and maintenance of air quality permits on Edwards AFB. Very few, if any, air quality permits would be required for this project as the majority of emissions will be due to mobile sources.

a. If a prescribed burn of 10 acres or more will be conducted, a burn plan and burn permit shall be required.

- Prescribed burns shall not exceed 22 acres in a given year prior to contacting the Environmental Management Division Compliance Branch for restrictions and limitations.

b. Any internal combustion engine subject to NESHAP or New Source Performance Standards requirements must be permitted by the local AQMD/APCD. Based on recent revisions to the Reciprocating Internal Combustion Engine NESHAP, all stationary generators are now subject to the regulation regardless of size – this in turn makes them subject to permitting requirements. Permitting is also required (retroactively) for any non-road engine that fails the indicia of portability (i.e. exceeds the 12-month time limit). If such equipment is to remain on base less than 45 calendar days, a written exemption must be obtained from the local air agency.

c. The proposed project shall not discharge from any source whatsoever, such quantities of air contaminants or other material that would: cause injury, detriment, nuisance or annoyance to any considerable number of persons or to the public; endanger the comfort, repose, health or safety of any such persons or the public; or cause or have a natural tendency to cause injury or damage to business or property.

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

e. Visible emissions (e.g., dust or smoke) from the proposed projects shall not exceed the limitations as outlined by the local air district.

f. Apply water or dust suppressants to roads and open areas where dust is being generated. If winds produce excessive visible emissions, erect wind barriers.

- Do not grade or till compacted dirt without applying water or dust suppressant.

g. Discontinue grading and other ground-disturbing activities at wind speeds exceeding 25 miles per hour.

h. All vehicles transporting fill material or debris shall be covered to reduce PM_{2.5} and PM₁₀ emissions during transport.

- i. Temporary coverings must be installed over open storage piles.
- j. All mechanical and construction equipment shall be kept in good working order according to applicable technical orders and the manufacturer's equipment maintenance manuals to reduce emissions to acceptable levels.
- k. The following dust control measures are required to be implemented during land preparation (i.e., clearing, grading, etc.) and/or excavation:
 - All soil excavated or graded should be sufficiently watered to prevent excessive dust. Watering should occur as needed with complete coverage of disturbed soil areas. Watering should be a minimum of twice daily on unpaved/untreated roads and on disturbed soil areas with active operations.
 - All clearing, grading, earth moving and excavation activities should cease during periods of winds greater than 20 miles per hour (mph) (averaged over one hour), if disturbed material is easily windblown or when dust plumes of 20% or greater opacity impact public roads, occupied structures or neighboring property.
 - All fine material transported off site should be either sufficiently watered or securely covered to prevent excessive dust.
 - All haul trucks should be required to exit the site via an access point where a gravel pad or grizzly has been installed.
 - Stockpiles of soil or other fine loose material shall be stabilized by watering or other appropriate method to prevent wind-blown fugitive dust.
 - Once clearing or grading has ceased, all inactive soil areas within the project area should either be seeded and watered until plant growth is evident, treated with a dust palliative or watered twice daily until soil has sufficiently crusted to prevent fugitive dust emission.
 - On-site vehicle speed should be limited to 15 mph.
 - All areas with vehicle traffic should be paved, treated with dust palliatives or watered a minimum of twice daily.
 - Streets adjacent to the project site should be kept clean and accumulated silt removed.
- l. The following measures should be implemented to control construction vehicle tailpipe emissions:
 - Properly maintain and tune all internal combustion engine powered equipment;
 - Require employees and subcontractors to comply with the ARB idling restrictions for compression ignition engines; and
 - Use CARB diesel fuel.

4.2.3 Alternative C Impacts

Although a plan to improve air quality is not directly addressed in the INRMP, overall long term air quality would be expected to improve slightly in response to the full implementation of the restoration and management programs. This alternative would also reduce PM10 by restoring natural hydrological processes and, in some cases, controlling soil erosion.

Under Alternative C, minimal increases to air quality impacts would be emissions from increased management activities (NO_x) generated by pick-up trucks driving to project sites, bobcat excavation for wildlife guzzlers, and a backhoe for installing desert tortoise exclusion fence. Even when combined with other emissions at Edwards AFB, these emissions would not be expected to exceed any NAAQS standards.

Concerns associated with Alternative C would be mitigated by complying with Alternative B measures (k), (l), and (m); no significant impacts to air quality would occur.

4.3 Safety and Occupational Health

4.3.1 Alternative A Impacts

A major safety concern at Edwards AFB exists for any ground-disturbing and related activities (e.g., biological surveys and monitoring wildlife, and habitat restoration due to disturbance by ERP activities) in high priority areas such as critical habitat because of the presence of unexploded ordnance (ammunition, grenades, and bombs) from past range activities. These types of ordnance are commonly referred to as UXO. This would not result in an adverse effect under Alternative A since natural resource personnel and other project personnel would follow established ordnance range safety briefings and procedures including observing a video on range safety before implementing any ground disturbance action.

Under Alternative A, there are two types of natural resource projects that are close enough to flightline operations (runways and taxiways) that would increase the potential for a BASH incident (i.e., bird surveys and bird removal projects). These types of activities may result in birds flying into running aircraft engines or causing an aircraft strike during aircraft taxiing, takeoff, and landing. These projects may also include use of falcons to chase/remove birds from hangars to eliminate bird nesting and colonizing inside hangars. All project personnel would review and adhere to the BASH plan to eliminate any potential occurrence of a bird strike on aircraft from surveys and monitoring and/or removal of birds on the flightline.

Limited use of nonchemical pest management techniques will occur in remote areas and is expected to not create a potential health hazard to personnel; chemical application methods would be performed only under the supervision of a DoD-certified pesticide applicator.

Natural resource personnel implementing projects during the hot and dry summers will be exposed to environmental hazards (e.g., extreme summer temperatures, and snakes). In addition, project personnel working with and near construction vehicles may pose a safety risk from being injured by a construction vehicle. Safety briefings are required at all times prior to beginning projects to eliminate any adverse safety impacts to project personnel.

4.3.2 Alternative B Impacts

Under Alternative B (e.g., removal of exotic, invasive plant species, and habitat restoration and management projects) have the greatest potential for negative safety impacts when encountering UXO. The impacts would be the same as described under Alternative A.

Use of nonchemical pest management techniques is expected to increase in remote areas versus Alternatives A and C. However, this is not expected to create a potential health hazard to personnel because chemical application methods would be performed only under the supervision of a DoD-certified pesticide applicator.

The impacts from project personnel being exposed to environmental hazards would be the same as described in Alternative A.

4.3.3 Alternative C Impacts

Under this alternative there would be some surveys, wildlife monitoring, installing tortoise fence and wildlife guzzlers, camera stations, construction of maternity bat roosts and control of soil erosion. Even though Alternative C involves minimal management, there is still a slight potential to encounter UXO from past range activities. However, management actions under Alternative C would not result in an adverse effect for the same reasons described in Alternative A.

4.4 Hazardous Materials, Solid Waste, and Green Waste

4.4.1 Alternative A Impacts

The potential exists for fuel or oil leaks from the increased use of vehicles and equipment during natural resource management activities. Edwards AFB maintains an Oil and Hazardous Substance Spill Prevention and Response Plan (SPRP) (AFFTC 1993a) that outlines procedures for spill response and cleanup, as well as individuals trained to clean up spills. Contractors and military working on Edwards AFB are briefed on spill response and cleanup procedures.

All hazardous and toxic materials would continue to be handled in accordance with Federal laws and Air Force regulations, including RCRA, FIFRA, and Toxic Substances Control Act (TSCA) (15 USC 2601 et seq.). Spills of hazardous materials (e.g., fuel or oil leaks) are always a possibility; however, Edwards AFB maintains a SPRP that outlines procedures for spill response and cleanup, as well as individuals trained to clean up spills.

Integrated Pest Management (IPM) emphasizes nonchemical measures, but does not rule out the increased use of chemical treatments as part of a pest removal plan. The increased reliance on nonchemical pest management techniques is not expected to create a hazard to the environment; the use of chemical treatments would be performed only under the supervision of a DoD-certified pesticide applicator. Thus, no adverse effects regarding the generation and or disposal of hazardous materials would be expected.

Vegetation (including wetland plants and exotic and invasive plants and pond sludge) removed to enhance the upland and aquatic habitat is considered green waste. Concrete blocks used to shore up the banks at the Piute Ponds Complex are considered solid waste. The green waste would be disposed of at an appropriate off-base landfill. Concrete would be collected from various construction projects on base and would be transported to the Piute Ponds Complex to shore up the berms and dikes surrounding the ponds. Thus, there are no negative impacts from generating and disposing of green waste and solid waste.

4.4.2 Alternative B Impacts

The high level management alternative (i.e., more restoration and management and exotic species removal projects) has the greatest potential for negative impacts. However, with the safeguards in place (as described in Alternative A), no negative impacts would be expected under this alternative.

Similar impacts regarding generation of and disposal of green and solid waste would be the same as described for Alternative A.

4.4.3 Alternative C Impacts

No negative impacts would be expected from hazardous materials, green waste, and solid waste under Alternative C since no hazardous materials, green or solid waste would be used or disposed of as described under Alternatives A and B.

4.5 Biological Resources

In general, all of the natural resource projects proposed under the various alternatives are designed to a degree to maintain or enhance the existing natural ecosystem; management levels range from high intensity management to low intensity management. Based on the INRMP goals and objectives and projects anticipated to be implemented based on available funds, there are greater potentials for beneficial results from these management actions/activities to the environment and the Air Force mission.

Under all alternatives considered, the NEPA project screening process would be expected to provide a successful process to ensure project compliance with laws and regulations affecting the current environment at Edwards AFB.

4.5.1 Vegetation

4.5.1.1 Alternative A Impacts

Alternative A would be expected to have limited habitat restoration projects based on requirements addressed in five ERP biological opinions. Alternative A would be expected to have limited exotic or invasive species removal projects as well. Alternative A uses a more systematic approach by inventorying and identifying areas to be restored and presence of exotic weeds (including recording their abundance and location), developing management options and resources required to program and obtain approval of projects to control exotic weeds. In addition, the base would utilize Best Management Practices (BMPs) for severe problem areas on a project-by-project basis. In areas not directly associated with a project, the vegetation resources would be protected from disturbances, but allowed to continue through its successional stages. However, the spread of exotic weeds is a recognized problem, and exotic species have been recorded on base as part of the baseline inventory.

The site-specific control plans would be guided by the IPM and revegetation plan and would emphasize a nonchemical approach; however, herbicide use would be considered appropriate. Limited use of herbicides should not result in the introduction of noxious weeds to an area. The

potential increase in the introduction of exotic species following control of weeds that could potentially have a major local impact on flora and fauna would be coordinated with the United States Department of Agriculture and USFWS before a decision is made to use such products. All herbicides used would only be applied by or under the supervision of a trained and certified pesticide applicator.

Without intervention, exotic weeds have a long history of becoming established and eventually becoming naturalized. Exotic species frequently do not support the native wildlife as well as the native species. Invasive species use mineral resources and space that would otherwise be available for the native vegetation. The removal of exotic weeds and the use of native seeds in restoration projects would be expected to improve the habitat conditions.

Disturbed areas would be identified and monitored as part of the long-term monitoring program. These disturbed areas would be restored using soil erosion control techniques that include the use of native plants and seeds in order to simulate the natural biodiversity. The vitality of the native vegetation would also benefit from restoration projects by using native seed stocks to enhance the population size and local distribution of native species. The net effect on these management activities would be positive.

Limited habitat restoration in the open desert will still benefit wildlife by providing some habitat continuity and is expected to minimally enhance the land by reintroducing native plant species to recover small islands of disturbance from past disturbance.

Edwards AFB will renew an Interagency Agreement with the United States Geological Survey (USGS) in FY15 to monitor released juvenile desert tortoises in support of the Desert Tortoise Head Start Program through FY18. This agreement will include the requirements stipulated in our USFWS Head Start Recovery Permit. This management action will provide valuable data on habitat survivability and habitat requirements regarding assisting with recovery efforts on the federal and state threatened desert tortoise. This is expected to contribute valuable data resulting in a beneficial impact to the recovery of the desert tortoise and future delisting.

4.5.1.2 Alternative B Impacts

Alternative B has the most potential for negatively affecting desert vegetation. More active levels of management would potentially include an increase of herbicide use in remote areas. Use of herbicides should not result in the introduction of noxious weeds to an area. The potential increase of exotic species following control of weeds that could potentially have a major local impact on flora and fauna would be coordinated with the United States Department of Agriculture and USFWS before a decision is made to use such products. All herbicide used would only be applied by or under the direct supervision of a trained and certified pesticide applicator.

An active level of management to manipulate plant succession (e.g., use of native seeds) would not be expected to produce significantly adverse impacts because the overall intent and design of these projects would be to improve the habitat conditions. Use of native seed would be expected to continue and enhance the development of native vegetation and simulate the natural biodiversity. These impacts would not be expected to be significant because of the management policies in place on Edwards AFB and expanded long-term monitoring and restoration programs.

Maintaining the overall biological diversity of aquatic habitat at Piute Ponds enhances wildlife habitat by implementing exotic weed control measures and actively managing the diversity of biological wetlands at Piute Ponds. Under Alternative B, an increase in pesticide use would be considered primarily in an undeveloped area for control of Tamarisk invasion at Piute Ponds. Tamarisk control will result in substantially reducing the invasion of Tamarisk, a plant species that requires large quantities of water to exist. This management strategy is expected to increase the native plant communities along the banks at Piute Ponds. The net effect on restoration and control of invasive plants and management of existing vegetation would be a positive action.

The creation of successional cattail/bulrush vegetation stands at Piute Ponds would produce a positive effect through adaptive management and lead to further control of invasive plants.

The use of fire as a management tool is primarily limited to burning wetland vegetation in Branch Park Pond and at Piute Ponds. Approximately 2 acres of Branch Park Pond would be burned every few years to create open areas for breeding and nesting tricolored blackbirds. The Piute Ponds Management Plan, a component plan of the INRMP discusses the acres and various ponds that will be managed by prescribed burns. Approximately 20 acres per year over a five year period may be burned depending on the growth and decaying of the vegetation. This effort will be coordinated with and supported by the base fire department. This management strategy is expected to produce positive impacts by burning dried and decaying, and dense vegetation that limits wildlife access and use. This would result in enhancing the aquatic vegetation by promoting new growth through creating open areas for wildlife use. Overall, the use of fire as a management tool would benefit wetland vegetation at Branch Park Pond and Piute Ponds Complex.

Establishing new and maintaining existing conservation areas and future acquisition of conservation lands and easements outside the base boundary would be expected to maintain the plant diversity by keeping those areas from being developed by commercial enterprises and disturbed by future natural resource and mission activities, respectively. Increased active habitat restoration in the open desert will create habitat continuity and is expected to enhance the site by reintroducing native plant species in order to recover the habitat from past disturbance. This management action will require years and monitoring to document the success of adaptive management techniques, especially considering the changes in climate and consecutive years of drought in the western Mojave Desert.

Road closure projects would involve using barriers (e.g., rocks and vegetation) and minimal translocation and planting of shrubs to camouflage rarely used access roads in remote areas. This will further restrict potential disturbance by limiting vehicle access to remote areas and would likely result in an increase of habitat diversity and maintain habitat continuity.

Working with Civil Engineer staff, to write and implement a xeriscape landscape plan would result in the use of native plants, eliminate the use of exotic plants, and reduce the potential of spreading the seeds of invasive species into the desert. This would result in a benefit for selected sites in the developed areas. By substantially reducing the seed bank of exotic and invasive plants, implementation of the landscape plan would also reduce competition for survival between invasive species and native species in the developed areas and habitat surrounding the developed areas.

4.5.1.3 Alternative C Impacts

Under Alternative C, management of natural resources at Edwards AFB would be expected to have a very minor impact to desert vegetation. The current management activities would not be expected to cause significant impacts to flora species on Base because it involves no quantifiable change in current activities.

Under Alternative C, there is a very minor adverse effect of vegetation loss from installation of an additional 5 wildlife guzzlers and installation/maintenance of desert tortoise fence due to their small areas of disturbance (about 300 square feet/guzzler and repairing exclusion fence in areas previously disturbed). These small amounts of disturbance would not produce a significant impact to desert vegetation.

4.5.2 Wildlife

4.5.2.1 Alternative A Impacts

In general, activities under Alternative A would represent a low-to-moderate management intensity for wildlife. Under this alternative, wildlife species would benefit from most management actions to maintain compliance with applicable federal and state laws and regulations. Restoring priority distributed areas from ERP activities and from other mission-related activities or natural causes) with native vegetation and seeds would potentially enhance the habitat for wildlife use.

Increased active habitat restoration in the open desert will benefit wildlife by providing areas of habitat continuity for cover and migration of wildlife. This management action will require years and monitoring to document the success of adaptive management techniques, especially considering the consecutive years of drought in the western Mojave Desert.

Site-specific impacts from the use of pesticides would vary based on the specificity of the pesticide and its persistence in the environment. Generally, the establishment would support a minimum of 100-foot buffer zones around sensitive areas including sensitive species habitat and relatively undisturbed habitat; this buffer should adequately protect sensitive areas. In addition, migratory birds would not be controlled with the use of pesticides.

The *Programmatic Environmental Assessment for the Control of Ground Squirrels in Military Family Housing and Other Industrial Areas of Edwards Air Force Base, California* (AFFTC/EM, 1996) analyzes the effects of chemical pesticides and trapping to control California ground squirrels; this document, incorporated by reference, contains mitigation/minimization measures and other environmental requirements to follow to ensure the protection of the environment and non-target wildlife.

An emphasis on non-chemical pest management techniques would reduce the current level of risk to target species (e.g., California ground squirrel). Environmental Management coordinates and advises the base pest control organization on use of pesticides and its effects to non-target species that have the likelihood of being exposed to such pesticides. Site-specific chemical impacts to non-target species would also be highly reduced by using non-chemical means. Non-

target species may include birds, reptiles, and small and large mammals. Predators to include coyote,

bobcat, badger, and birds are examples of non-target species. However, predators may also accumulate pesticides in their systems and pass them on to other predators higher up the food chain.

Nonchemical controls under this alternative are not expected to reduce wildlife populations (other than the target species) below self-sustaining levels. The introduction of exotic species for pest control purposes is a nonchemical means of pest control that could potentially have a local impact on flora and fauna. Only biological control approved by the United States Department of Agriculture would be considered for use. In addition, any biological control used by Edwards AFB would be coordinated with the appropriate federal and state agencies.

Pesticide use would not be expected to impact wildlife because they would be applied by, or under the direction of, a trained and certified pesticide applicator, and IAW the IPM plan and close coordination with Environmental Management.

Future acquisition of conservation lands and easements outside the base boundary and establishing and maintaining existing conservation areas would benefit wildlife in those areas for their livelihood. By keeping those lands from being developed by commercial enterprises, the base would not become an island refuge for an influx of wildlife species.

4.5.2.2 Alternative B Impacts

Alternative B has the most potential for impacting wildlife resources. A more active level of management would potentially include an increase in pesticide use, and mechanical measures for control of California ground squirrels. Initially, pesticides have the potential to remove undesirable wildlife such as the California ground squirrel. An active level of management for natural resources would not be expected to produce significantly adverse impacts because the intent and design of pest control would be to remove wildlife that tend to degrade the habitat. Impacts to non-target species are discussed in Alternative A, but would be expected to increase under this alternative. However, pesticide use would not be expected to impact wildlife because they would be applied by, or under the direction of, a trained and certified pesticide applicator, and IAW the IPM plan and in close coordination with Environmental Management.

This alternative has the greatest potential to effectively control pests, but an increased reliance on nonchemical pest management techniques with only increased chemical use also has the greatest potential for negative or adverse impacts. Where chemical techniques are recommended or discussed in the environmental assessment for control of ground squirrels (AFFTC, 1996), the pesticides recommended would be the least toxic and least persistent that are expected to be effective for controlling the target organism. Techniques to minimize the amount of pesticides applied would be used whenever possible. Such techniques include using proper equipment, as well as following correct application timing and sequencing procedures. Precautions would be taken to purchase only as much pesticide as would be needed for a season and to minimize the amount of pesticide mixed and applied. All pesticides used would be applied by or under the supervision of a trained and certified pesticide applicator.

Controls would be implemented in accordance with Federal, State, and local laws and project use would be limited by the use of buffers; there should be no overall adverse impact to the existing flora and fauna except for the targeted pest. There may be minor site-specific impacts to non-target species that are also impacted by the chosen pest control methods, but these controls are not expected to reduce wildlife populations other than the target species below self-sustaining levels.

Establishing new and maintaining existing conservation areas would be expected to maintain wildlife diversity by keeping those areas from being developed and disturbed from future natural resource projects, mission activities, and commercial development.

The creation of successional cattail/bulrush vegetation stands benefits waterfowl and shorebirds at Piute Ponds. The net effect on restoration and control of invasive plants and management of existing wetland vegetation would result in a positive action. Active restoration and manipulation of plants in upland and aquatic habitat and initiating closure of non-essential roads would benefit wildlife by increasing cover and food resources. This action would also create selected sites for nesting, feeding, breeding, and raising of young.

Flooding of Rosamond Dry Lake by using tertiary treated water from D-14 would result in providing a water source for various shrimp species to hatch out; thereby, creating a viable food source on the lakebed for migratory shorebirds.

No adverse effects are expected for implementation of the Piute Ponds Management Plan, a component plan of the INRMP. Projects implemented under the Piute Ponds Management Plan would result in a major benefit to wildlife such as:

- Managing the flow of water from pond to pond;
- Managing the depths of various ponds to attract a variety of waterfowl and shorebirds;
- Providing overflow of water to Rosamond Dry Lake to extend life of shrimp species that will be a food source for shorebirds;
- Creating feeding, breeding, nesting habitat and providing space for raising of young for a variety of wildlife; and
- Providing a rest stop and food source during annual bird migration.

The use of fire as a management tool would be primarily limited to burning wetland vegetation in Branch Park Pond and at Piute Ponds. This management strategy is expected to produce positive impacts by burning dried, decaying, and dense vegetation that limits wildlife access and use. Approximately 2 acres of Branch Park Pond would be burned every few years to create open areas for breeding and nesting tricolored blackbirds. The Piute Ponds Management Plan discusses the acres and various ponds that will be managed by prescribed burns. Approximately 100-200 acres per year over a five year period may be burned depending on the growth, density, and decaying stages of the vegetation. These actions will be coordinated with and supported by the base fire department. These management actions would result in enhancing the aquatic vegetation by creating open areas for wildlife use (e.g., feeding, breeding, and raising of young) and

promoting new growth. Overall, fire would maintain both tricolored blackbird and waterfowl breeding and nesting habitat at Branch Park pond and Piute Ponds, respectively. In addition, managing water depths before and after burning at individual ponds would create suitable habitat for various species of waterfowl and shorebirds during migration.

Implementing predator control in association with Air Force Security Forces and the California Department of Agriculture personnel would involve removal of predators (coyotes and bobcats) that constantly prey on pets and exhibit hostile behavior towards humans in the developed areas. Before removal is implemented, many actions would be implemented such as education via Air Force Desert Wings newspapers, briefings, town hall meetings, not leaving out pet food, not leaving a pet outside at night by itself, and point of contact should an issue arise. This management activity would only result in an adverse effect to a few wildlife species (coyotes and bobcats) that choose to be a constant danger to base personnel and their pets.

Ongoing coordination with other federal and state agencies and local governments has the potential of restoring a portion of the natural hydrological processes whereby storm water would be allowed to flow through natural drainages (intermittent streams) to the lakebeds and Piute Ponds. This would be a benefit to wildlife by extending the season for feeding, breeding, nesting, and raising of young; thereby, producing an abundance of wildlife or at least maintaining the current wildlife diversity and population numbers.

4.5.2.3 Alternative C Impacts

Limited minor effects on game and nongame species would be expected to continue under the No Action Alternative. The health and condition of many wildlife populations would be unknown and success of adaptive management approaches would not be realized due to minimal implementing actions that result in minimal compliance with federal and state laws and regulations. Potential declines in habitat quality and diversity would continue to negatively affect wildlife populations and biodiversity since only a minimum of beneficial projects would be programmed and executed (e.g., restoration of habitat from ERP activities to support an increased diversity for wildlife, maintenance of wildlife guzzlers, minimal treatment of pests, a reduction of environmental compliance education for off-base personnel, minimal compliance with desert tortoise biological opinions).

Under this alternative, the number of wildlife guzzlers would be expanded from 19 to 24 and designed to limit habitat disturbance to the maximum extent. An increased number of guzzlers would enhance wildlife populations by providing water during periodic droughts.

Less intensive management actions to control pests would occur under this alternative. Continuing current pesticide and non-chemical management techniques would not be expected to negatively affect or reduce wildlife populations other than the target species below self-sustaining levels. The use of pesticides would continue to be applied only by or under the supervision of a trained and certified pesticide applicator. There would be a potential for impacts to non-target species. These non-target species include predators on the target species; non-target predators tend to keep the target species populations in check. Predators may also accumulate pesticides in their systems and pass them on to other predators higher up on the food chain. The site-specific impacts would vary based on, among other things, the specificity of the pesticide and its persistence in the

environment. Currently, there is no use of biological materials for pest control purposes. However, limited pesticide use would not be expected to impact wildlife because they would be applied by, or under the direction of, a trained and certified pesticide applicator, and IAW the IPM plan and close coordination with Environmental Management.

At this time, no maternity bat roosts are known to occur in abandoned buildings that would be scheduled for demolition. Pre-surveys of abandoned buildings scheduled for demolition would determine the presence or absence of any maternity bat roosts. If a maternity bat roost is discovered in an abandoned building scheduled for demolition, the building would either be maintained or replaced with an artificial maternity bat roost. Leaving the building in place would result in a no effect to maternity roosting bats. Creation of artificial maternity bat roosts would offset the loss of maternity habitat resulting in a no effect to roosting bats.

4.5.3 Desert Tortoise and Other Protected Species

4.5.3.1 Alternative A Impacts

Beneficial effects on federally listed species (desert tortoise) and state listed species (Mohave ground squirrel) and California rare plant species known to reside on Edwards AFB would be expected from implementation of Alternative A. The INRMP lists the federal, state, protected, and other species that Edwards AFB plans to manage IAW applicable laws, Air Force Instructions, policies, and the management goals and objectives described in the INRMP. The USFWS and CDFW are the coordination agencies on the development and concurrence of the INRMP with respect to their responsibilities.

All known and foreseeable Air Force actions that have the potential to affect the desert tortoise and its habitat (including ground disturbance actions) are identified in the base's 22 active biological opinions. The USFWS has determined in the subject biological opinions prior to 2014 that the action is not likely to jeopardize the continued existence of the desert tortoise or result in adverse modification of critical habitat.

In the latest USFWS 2014 biological opinion on the desert tortoise, and after reviewing its current status, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the USFWS's biological opinion that the proposed action is not likely to jeopardize the continued existence of the desert tortoise. The USFWS reached that conclusion for the following reasons. First, the Air Force has proposed measures to reduce the number of desert tortoises that are likely to be injured or killed in the course of its activities. Second, the few desert tortoises that the Air Force is likely to kill is a minor fraction of the number of desert tortoises range-wide; the loss of these animals is unlikely to measurably affect the number of desert tortoises or reproductive capacity of the listed taxon. Third, the Air Force's efforts to reduce hazards to desert tortoises (e.g., fencing roads and closing excavation in which they can become trapped) are likely to reduce the level of ongoing mortality on base. Fourth, the loss of habitat that is likely to occur during future activities at Edwards Air Force Base will not appreciably reduce the distribution of the desert tortoise (USFWS, 2014).

After reviewing the current status of critical habitat by USFWS for all Operations and Activities at Edwards AFB, the environmental baseline for the action area, the effects of the

proposed action, and the cumulative effects, it is the Service's biological opinion that the proposed action is not likely to result in the destruction or adverse modification of critical habitat of the desert tortoise. The USFWS reached that conclusion because the amount of critical habitat that is likely to be affected comprises a small portion of the total amount of the critical habitat on Edwards Air Force Base, which itself is a small portion of the larger Fremont Kramer Critical Habitat Unit, and an even smaller portion of critical habitat range-wide. Therefore, the amount of disturbance is not likely to compromise the conservation function and value of critical habitat for the desert tortoise (USFWS, 2014).

Additionally, the base strictly adheres to the terms and conditions and reasonable and prudent measures of all of its biological opinions to ensure compliance IAW the ESA and the applicable biological opinion.

After a review of the existing data by the USFWS, the USFWS concurred and required no further consultation unless (1) the identified action is subsequently modified in a manner that causes an effect on a listed species or designated critical habitat; (2) new information reveals the identified action may affect Federally-protected species or designated critical habitat in a manner or to an extent not previously considered; or (3) a new species is listed or critical habitat is designated under the ESA that may be affected by the identified action.

Edwards AFB will renew an Interagency Agreement with the United States Geological Survey (USGS) in FY15 to continue to monitor and track movements of the released juvenile desert tortoises in support of the Desert Tortoise Head Start Program through FY18. This effort will follow the requirements in the agreement and be IAW requirements stipulated in our USFWS Head Start Recovery Permit. This management action will provide valuable data on habitat survivability and habitat requirements regarding assisting with recovery efforts on the federal and state threatened desert tortoise.

Management of the current Desert Tortoise Adoption Program is an ongoing program that is monitored. The tortoises in the Adoption program are being cared for by base residents. If an owner is transferred to another base, the tortoise is adopted by another family. If an adopted tortoise contracts a disease, it would not be released back into the desert environment; therefore, it would not be able to spread the disease to wild tortoises. Thus, no adverse effects to wild tortoises are anticipated.

Developing management strategies for proposed, candidates, and sensitive species prior to being listed as threatened and/or endangered, would benefit wildlife. This would result in ensuring that future impacts to those species would be substantially reduced to increase their survivability. Long term monitoring activities and implementing adaptive management practices to protect such species would also ensure that no adverse effects would occur.

An emphasis on mechanical, biological, and limited chemical pest management techniques would reduce the overall probability that threatened or endangered species are harmed, either directly or indirectly, by invasive exotic species. All known sensitive species populations would be buffered from pesticide application. Any pesticide application within the 100-foot buffer zones would require an additional assessment prior to treatment, and would be coordinated for approval

by the agency with jurisdiction by law or special expertise. All pesticides used would only be applied by, or under the supervision of, a trained and certified pesticide applicator.

Disturbed areas would be returned to natural contours and reseeded with native plants (including a number of restoration sites to offset impacts to ERP activities). This effort would be more active than historic practices by including limited watering and limited use of fertilizer. Few natural resource management practices would be expected to cause significant ground disturbances, and areas with sensitive species are identified through the GIS program for special consideration and conservation. Protected species, including migratory birds, would also benefit from the Base's policy of restricting harvesting or taking of natural products and other ground-disturbing activities. While there is a limited potential for a "take" of a listed species incidental to the management activities, it is considered unlikely because of the monitoring program. No reintroductions of expatriated species are planned under this alternative.

The Mohave ground squirrel, a state listed threatened species resides on base. Numerous studies have been completed on their distribution, age class, current status, and population viability since the late 1980's. The latest data from these reports indicate the population is stable. The primary reason for maintaining a stable Mohave ground squirrel population is that Edwards AFB has minimized its natural resource ground disturbing actions over the years. Ground disturbing actions under this alternative involve habitat restoration which is designed to improve habitat and would benefit the Mohave ground squirrel by selecting seeds and plants known to be used by them. In addition, during the NEPA review and analysis of all natural resource projects where ground disturbance would occur, environmental measures are required to avoid areas containing previously known or occupied Mohave ground squirrels. Therefore, restoration of habitat should not result in a significant adverse effect to Mohave ground squirrels and their occupied habitat.

Surveys for rare plants such as Alkali mariposa lily (*Calochortus striatus*), Barstow woolly sunflower (*Eriophyllum mohavense*), and desert cymopterus (*Cymopterus deserticola*), *Eriastrum rosamondensis*, and others discussed in the INRMP would occur in various habitats on Edwards AFB. Numerous studies have been completed on their distribution, abundance, and population numbers. With adequate rainfall, these plants tend to be more numerous and become more widely distributed. Surveys for rare plants and documentation on new locations would benefit the species so these areas can be avoided during planning and implementation of natural resource projects. In addition, habitat restoration of selected sites is not expected to occur in areas where rare plants are found. Thus, no adverse effects would be expected to sensitive plants.

Natural resource projects involving migratory birds include surveys, monitoring, and collecting data during recurring baseline inventories. These management actions help to identify and protect migratory birds prior to and during natural resource project implementation. Acquiring conservation lands and easements also helps to protect and secure migratory bird nesting habitat in the future under the REPI program. All management actions that may impact migratory birds would be conducted IAW the requirements of the Migratory Bird Treaty Act. Thus, adverse effects to migratory birds would not be anticipated under these management actions.

On the other hand, the use of falcons within the flightline area to control and chase out and physically remove migratory birds in hangars and other buildings would be a negative impact to such birds. However, the base has a USFWS depredation permit to "take" birds on the flightline to

prevent a BASH incident to aircraft which would otherwise pose a risk to pilots and potential damage to aircraft. Compliance with the depredation permit would not result in a significant effect from implementation of the approved USFWS Depredation Permit.

4.5.3.2 Alternative B Impacts

Alternative B, a high level of management actions has the most potential for impacting wildlife resources. This includes managing federally listed threatened and endangered species, species protected under the Migratory Bird Treaty Act, and moderate intensity management for state listed and protected species, and rare plant species. On the other hand, a high level of active management has the greatest potential to protect the desert tortoise and its habitat, rare plants, and other protected species. Impacts to rare, threatened, and endangered species would be expected to be more beneficial because an increased level of inventories, monitoring, and some moderation of managing sensitive species would occur. If rare, threatened, or endangered species were found on any of the test or training sites, they would be actively identified, monitored, and managed to ensure their continued survival in the area. The net effect on these management activities would be positive.

A high level of active removal of exotic weeds in critical habitat and invasive plants at Piute Ponds would be used under this alternative. These types of actions have the potential to enhance the habitat. No adverse impacts would be expected under this alternative because the management practices would be performed by or under the supervision of trained wildlife biologists using accepted ecosystem management practices. The use of native seeds as part of restoration and management projects would also be expected to improve the conditions in disturbed areas.

The impacts and discussion on potential adverse effects for a low to modern management intensity were analyzed under Alternative A and are similar to those management actions planned for implementation under Alternative B. However, impacts discussed for natural resource actions under Alternative B would be slightly more beneficial for most projects but would still not be significant since all federal, laws, regulations, Air Force Instructions, and applicable state laws and regulations would be followed. These include the following natural resource management actions: review/evaluate active management strategies, and success of goals, and objectives, management and restoration of upland and aquatic habitats (including prescribed burns in wetland vegetation); remove/eradicate exotic, invasive species; implement threatened and endangered species programs and activities; implement terms and conditions of the desert tortoise biological opinions; reintroduce native plant species; and manipulate plant succession to increase diversity. These management actions benefit listed and protected species.

Closure of non-essential roads would benefit both the habitat and wildlife species such as desert tortoise, Mohave ground squirrel, and sensitive plants by eliminating access to sensitive resource areas. The use of rocks, sticks, dead and live vegetation would camouflage the road and discourage or eliminate its use.

In conclusion, an increase of beneficial effects on federally listed species (desert tortoise) and state listed species (Mohave ground squirrel) and California rare plant species known to reside on Edwards AFB would be expected from implementation of Alternative B.

4.5.3.3 Alternative C Impacts

Minor impacts from current management actions to federally listed wildlife species (primarily the desert tortoise) would be expected from restoration of habitat based on ERP activities. However, the impacts would be substantially less than Alternative A since restoration of habitat would occur on sites approximately 1,000 square feet in size would be expected to increase habitat diversity for the desert tortoise, rare plants, and other protected species. Current natural resource management actions do meet the minimum requirements of the ESA and adequately protect listed species from an unauthorized “take.”

Extremely limited ground disturbance may occur due to the control of soil erosion by planting native plants and using native seeds. Actions for natural resource management under this alternative would be more reactive than proactive. This would result in significantly fewer impacts to adjacent habitats from introduction of invasive and exotic plants.

Implementing the requirements of all the biological opinions with respect to natural resource actions would continue to protect the tortoise and its habitat and result in substantially reducing impacts from minor ground disturbance actions. These minor ground disturbance actions would involve installing desert tortoise awareness signs and desert tortoise exclusion fence. Installing and maintaining desert tortoise signs (indicating areas with a high potential to encounter tortoises) would remind personnel to be more aware of desert tortoises while driving vehicles on dirt roads and riding bikes on trails. Installing and maintaining desert tortoise exclusion fence along well-traveled roads and in areas determined to be hazardous to tortoises (open mine shafts and deep prospect pits on the PIRA and within other remote areas, and rocket motor/engine test areas at the AFRL) would prevent tortoises from entering those hazardous areas. These types of management actions benefit the desert tortoise.

4.6 Cultural Resources

Surveys and evaluations of cultural resources would be conducted for ground disturbance actions (including any management action at the Piute Ponds Complex associated with the Piute Ponds Management Plan) prior to initiating a natural resource action. All ground disturbing actions would continue to be coordinated through Edwards AFB’s Base Historic Preservation Officer (BHPO) and would not be performed in areas with known sensitive cultural resources. There are no known buildings or sites eligible for the National Register that has the potential to be impacted under any of the alternatives considered. Therefore, no adverse impacts from natural resource management activities would be expected to cultural resources under any of the alternatives considered for implementation.

The consultation process with American Indian Tribes associated with Edwards AFB is ongoing as part of the overall Air Force program. Any natural resource action that would have the potential to affect a cultural resource site associated with a federally recognized tribe would involve a consultation by the Edwards AFB BHPO and coordination with and concurrence from the SHPO. Copies of the EA and INRMP would be made available to the designated Native American Tribe’s points of contact and the California SHPO as part of the consultation process.

4.6.1 Alternative A Impacts

The proposed implementation of the revised INRMP would be expected to be beneficial to the conservation of cultural resources. Under Alternative A, the probability of disturbing potential cultural resource sites should be substantially reduced because of the use of an integrated and coordinated approach. Alternative A includes steps to protect cultural resource sites from damage or an adverse effect prior to and during natural resource project implementation. Ground-disturbing natural resource projects in areas not previously surveyed must have site-specific surveys conducted and evaluated prior to implementation. Implementation of Alternative A would provide for a more formalized coordination and integration of cultural resource issues into the natural resource management program. The review of projects by the BHPO and the NEPA process are used to ensure conservation of known and potential cultural resources. Development of a systematic restoration and management protection program, particularly limiting access to identified sites and patrols by law enforcement, thus, reducing the potential for theft of artifacts, would result in a significant benefit to archeological resources. For any ground disturbing activities, the proponent/contractor shall comply with the minimization measures listed under section 4.6.2, Alternative B.

4.6.2 Alternative B Impacts

While this alternative would have a greater potential for impacting cultural resources, it is not expected to have any direct negative effects. The integration of the planning process for all natural resource projects would provide safeguards, and individually, they would all comply with cultural resource laws and policies. Many actions described in Chapter 2 under this alternative are potential undertakings that could require site-specific cultural resource surveys in areas not previously surveyed. Specific ground-disturbing projects proposed for areas not previously surveyed would drive the number and type of required surveys and subsequent evaluations as well as coordination and consultation with tribes and coordination and concurrence with the SHPO.

The following minimization measures are required to reduce any potential cultural impacts to less than significant levels:

- a. Coordination with the Cultural Resources Management Office shall be required during the early planning phases of natural resource projects where ground disturbance activities are anticipated to avoid any potential adverse effects to cultural resources.
- b. The proponent shall coordinate with the Cultural Resources Management Office prior to the commencement of field operations in order to afford the office the opportunity to evaluate subsurface contexts during the course of the undertaking's on-going operations.
- c. If inadvertent above- or below-ground discoveries (e.g., artifacts or bones) are made during the project's execution:

The Proponent/Contractor shall:

- Immediately cease activity in the area of the discovery.
- Notify the supervising Project Manager.
- Secure the discovery location and establish a 50-foot buffer zone around the discovery.

The Project Manager shall:

- Immediately notify the BHPO of the discovery.
- Confirm that the activity has ceased within 50 feet of the discovery.
- Examine the location of the discovery to ensure that it has been properly secured. Take appropriate measures to further secure the location, if needed.
- Await review by 412 CEG/CEVA before returning to work in the area of discovery.

4.6.3 Alternative C Impacts

Under Alternative C, there would be no adverse effects on cultural resources at Edwards AFB due to the extremely limited amounts of ground disturbance activities. The primary concern under Alternative C pertains to protecting sites within the Edwards AFB boundary (about 307,517 acres). Any planned disturbance would continue to be reviewed and evaluated via the NEPA process by the BHPO and possible mitigation actions coordinated with the SHPO to receive concurrence. For any ground disturbing activities, the proponent/contractor shall comply with the minimization measures listed under section 4.6.2, Alternative B.

4.7 Soils

4.7.1 Alternative A Impacts

Alternative A includes an integrated program for the planning of land use and maintenance and repair of damaged lands. Brief periods of increased soil erosion could occur during maintenance and rehabilitation of damaged or disturbed sites. Stability of soils would be associated with habitat restoration projects. Stabilization of native vegetation would be implemented on disturbed areas to prevent soil erosion. Eradication of exotic and invasive species by mechanical and hand removal actions and implementing restoration projects would be expected to increase moderately. While restoration projects would result in temporary disturbances, the short-term disturbances would benefit by the long-term enhancement of the habitat.

Other natural resource projects proposed for implementation and as described in Chapter 2 do not involve land disturbance and would not result in adverse impacts to soils. Examples of these management actions would be inventories, surveys, monitoring, partnering with private organizations, managing the tortoise adoption program, establishing MOAs and Interagency Agreements, managing the hunting and volunteer program, implementing the terms and conditions of the desert tortoise biological opinions, supporting the BASH plan, and developing and implementing management strategies for sensitive, proposed, and candidate species.

4.7.2 Alternative B Impacts

Edwards AFB's soil resources would benefit from management at a more active level. Performing additional systematic rehabilitation and preventive maintenance projects could prevent soil loss and facilitate the military mission by improving land conditions. Trails in ORV areas would be improved. More restoration and management projects would be expected from loss of habitat from ERP actions to track ground water plumes resulting from contamination of the environment. Ground disturbances associated with these projects would be expected to be temporary, usually one growing season or less. Areas devoid of vegetation for whatever reason

would benefit from more active and systematic management. Implementing an adaptive management technique would lead to better seeding techniques during the most appropriate seasons. In addition, closure of non-essential roads would improve the continuity of habitat and reduce the impacts to geology and soils. Restoration of roads would reduce the potential for continued soil erosion and substantially reduce loss of topsoil by restoring vegetation in disturbed areas.

Coordinating with off-base local government agencies and private entities to educate them on the importance of reducing the amount of storm water captured up stream and allowing the natural hydrological processes to continue would benefit Rosamond Dry Lake by inundation of soils to the lakebed surface. The soils would fill in the lakebed cracks from storm water runoff and allow for a rejuvenation of the lakebed surface by distributing the soil evenly during wind-wave actions associated with standing water. This would result in a positive action to the Air Force test mission by allowing aircraft to land and takeoff on the lakebed; the lakebed is also used as an emergency runway.

Acquiring conservation easements of land outside the base boundary in association with the REPI program protects and secures habitat from future land disturbance that would negatively impact soils by wind and water erosion. This would result in a positive impact to soils in the open desert by preventing future surface disturbances

Natural resource projects implementing prescribed burns at Piute Ponds and Branch Park pond are not anticipated to negatively affect soils. These areas are already inundated by water and removing wetland vegetation in areas previously disturbed and inundated with water would not result in a significant impact. All prescribed burns would be coordinated with and supported by the base fire department and follow the management direction stipulated in the Wildland Fire Management Plan (2015) and the base fire department's 2013 standard operating guidelines.

Maintaining functional watersheds and natural surface and conducting maintenance operations at Piute Ponds and Branch Park pond are not anticipated to negatively affect soils. These areas are already inundated by water and removing wetland vegetation by mechanical means in areas previously disturbed and inundated with water is not expected to result in a significant impact to soils. Other natural resource projects proposed for implementation and as described in Chapter 2 do not involve land disturbance and would not result in adverse impacts to soils. Examples of these would be inventories, surveys, monitoring, implement predator and pest control actions, establish on-base conservation areas, and assist with development of a landscape management plan and update of the golf course management plan.

4.7.3 Alternative C Impacts

Extremely minor adverse effects could be expected under this alternative because this alternative does not include the implementation of integrated soil resource monitoring and a systematic plan to minimize existing, or to prevent future soil erosion and sedimentation problems on Edwards AFB. Implementation of Alternative C would involve more reactive management to severe problem areas, rather than managing the resource to prevent impacts or to minimize the extent of unavoidable impacts. The 1997 amendments to the Sikes Act require maintaining the

capability of Edwards AFB to support its military mission. This alternative meets the bare minimum of compliance with the Sikes Act.

Soil erosion is potentially a major problem at Edwards AFB. It naturally occurs due to numerous wind events and minimal rainfall. Soil conditions would continue to benefit from implementation of temporary erosion control measures following site-specific projects on an as-needed basis. Most project-related ground disturbances (habitat restoration projects) would be expected to be of a very temporary nature. Soils would also be expected to benefit from the continued implementation of restoration projects that would lead to stabilizing soils.

Implementing the requirements of all the biological opinions with respect to natural resource actions would continue to protect the tortoise and its habitat and result in substantially reducing impacts to soils from minor ground disturbance actions. These minor ground disturbance actions would involve installing desert tortoise awareness signs and desert tortoise exclusion in previously disturbed areas. Installing and maintaining desert tortoise 4" x 4" posts and signs would only disturb a few feet by digging a hole for a post and sign; this natural resource action is not expected to negatively affect topsoil or result in soil erosion. Installing and maintaining desert tortoise exclusion fence along well-traveled roads and in areas previously disturbed is not expected to negatively affect topsoil or result in furthering soil erosion from past actions.

Other natural resource projects proposed for implementation and as described in Chapter 2 do not involve land disturbance and would not result in adverse impacts to soils. Examples of these would be installing camera stations and signage for wildlife and recreation use, providing environmental education at Air Shows and during Earth Day, construction of suitable maternity bat roosts in previously disturbed areas, maintaining abandoned buildings that serve as maternity bat roosts, and assisting with the designation of the office of primary responsibility for ORV Area 2.

4.8 Socioeconomic Conditions

Under all alternatives considered, there would be no expected change in the number of permanent employees working at Edwards AFB and expected actions would be accomplished within the Base's authorized strength levels. From an economic standpoint, there are almost no expected economic changes from the current baseline. While some of the specific projects would be expected to be contracted off base, supplies would most likely be purchased locally. The regional economy would benefit incrementally under any of the alternatives because the proposed plans would not significantly alter money flow out of the region. Future population and employment fluctuations in and around the Edwards AFB training sites are likely, but would not substantially influence the Base's management of natural resources due to their limited scope and relative low cost, compared to the overall Base budget. None of the proposed alternatives would be expected to directly foster major economic or population growth, require additional housing, remove obstacles to growth, tax community service facilities, or encourage or facilitate other activities that would potentially cause significant environmental effects because of the anticipated limited number of programmed projects and subsequent expected budget.

Re-use (i.e., recycling) of concrete blocks or chunks from ongoing construction projects to shore up the berms and dikes at the Piute Ponds Complex would result in an incremental savings to

the Air Force by not having to pay for hauling the solid waste off base for disposal at an approved landfill.

4.9 Recreation and Quality of Life

Natural resource management actions under all the alternatives would result in improving the recreation opportunities for base personnel (e.g., hunting, fishing, birding at Piute Ponds, and use of ORV areas 1 and 2). Dredging and removing vegetation from the banks of Branch Park Pond provides additional space and fishing access for more personnel to enjoy. Stocking fish at Branch Park pond provides for enhanced quality of life, especially for the kids of military parents. Thus, recreation opportunities would be maintained for base personnel resulting in a better quality of life.

Off-base personnel would also benefit from enhanced recreational opportunities such as hunting and birding at Piute Ponds. Stocking game birds (chukar and California quail) and installing and maintaining wildlife guzzlers also enhance hunting opportunities by providing supplemental water to maintain or increase game bird populations during drought periods. In support of the hunting program, construction and maintenance of the duck blinds provide support for the hunters during waterfowl hunting season. Dredging and water management of Piute Ponds create habitat for migratory waterfowl which allows hunters to be more successful in reaching their hunting bird limit. These management actions enhance hunting opportunities. No adverse impacts would be expected from increasing/enhancing recreation opportunities.

4.10 Cumulative Impacts

A cumulative impact is defined by CEQ (40 CFR 1508.7) as an impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts overlap impacts of other activities in time and space. Cumulative impacts can result from individually minor but collectively significant actions taking place locally or regionally over a period of time. This type of interaction is expected to be rare because an INRMP by design incorporates existing installation planning documents (i.e., General Plan) and management plans (e.g., Integrated Pest Management Plan, Wildland Fire Management Plan, Piute Ponds Management Plan). In accordance with the Sikes Act, the INRMP is required to be reviewed annually and updated every 5 years. Development and implementation of the INRMP would result in a comprehensive environmental strategy for Edwards AFB that represents compliance, restoration, prevention, and conservation of natural resources. The INRMP improves the existing management approach for natural resources on the installation; and meets legal and policy requirements consistent with natural resources management philosophies. Over time, adoption of any of the alternatives would be expected in order for Edwards AFB to achieve its goals of maintaining ecosystem biodiversity and viability and ensuring sustainability of desired military testing and training area conditions.

The INRMP development involves establishing partnerships with Federal, State, local groups, and private entities. These partnerships further reduce the possibility for cumulative effects arising that have not already been considered within the INRMP. By their nature, integrated planning, ecosystem management, and partnering are techniques that significantly reduce or minimize cumulative effects. Outside of the actions included in the INRMP, several general actions may

result in cumulative effects, for example, major changes in the Base's military mission; major funding or personnel changes; significant changes in local, County, or State planning and development (i.e., changes in land use) of the surrounding areas; and major highway construction. As new, relevant issues or initiatives arise (on or off-Base or within the State, local, or regional community), they would be considered in the INRMP at either the annual review or 5-year update period. Consequently, there is a reduced possibility for cumulative impacts arising that are not already considered in the INRMP. Associated long-term monitoring of study plots and project sites will also contribute to a reduction in negative cumulative impacts through adaptive management strategies based on a rating of the success of management actions.

The AFTC will remain responsive to the changing conditions and urgent requirements of the 21st Century. Although growth and development can be expected to continue outside Edwards AFB and the surrounding natural areas, the environmental impacts of the development may adversely affect natural resources within the ecoregion. The management activities proposed for Edwards AFB would not be expected to result in cumulative adverse impacts on these resources when added to the impacts of activities associated with the proposed management measures contained in the INRMP. There has been no irretrievable or irreversible commitment of funds or resources associated with the management of this INRMP.

Alternative A (No Action Alternative), Alternative B (high level management action), and Alternative C (low level management action), were evaluated to determine the potential cumulative impacts that may arise under each of the potential future conditions. Alternative A would not be expected to have significant negative environmental consequences. While there may be short-term minor adverse impacts, the net impact should be generally positive. Alternative B has the greatest potential for a wide range of environmental consequences, ranging from very positive to minor negative impacts on various components of the environment. Alternative C presents the least amount of impacts; however, most management actions associated with this alternative are more beneficial than negative.

4.10.1 Alternative A Impacts

Alternative A consists of management intensities targeted to the specific needs of a given resource category and would provide Edwards AFB managers with a reasonable ability to respond to issues that could potentially result in negative cumulative effects. For example, the USFWS has stated in the past that habitat loss and exotic species invasion are the two most significant factors related to endangered species. This alternative moderately increases the extent of habitat restoration and provides a systematic approach for exotic and invasive species removal. This alternative contains sufficient flexibility in its initiatives and monitoring to allow meaningful adaptive management. The increased management efforts for wildlife and habitat resources and soils, and continued integration of management activities, would place Edwards AFB in a favorable position to respond to and limit negative cumulative effects. Changes in mission, funding, or personnel reductions or changes in off-site land use planning and development could be responded to through adaptive management and could be incorporated into the subsequent update of the INRMP. Updating the INRMP could realign the management intensities to support mission or other changes promoting positive cumulative effects such as refining the native seed mix for enhancing recovery in restoration or soil erosion control projects. This alternative would also encourage additional new partnerships.

4.10.2 Alternative B Impacts

The increased funding level and personnel support of this alternative would permit Edwards AFB to substantially increase the number of restoration projects, remove more exotic and invasive species, reintroduce native plants, manipulate successional stages of vegetation, restore and maintain functional watersheds and biological wetlands, close more unused roads to enhance habitat continuity, and acquire conservation easements, increase biological surveys and monitoring, and review and evaluate active management actions, strategies, and success of goals and objectives. All of these actions involve a general improvement of conditions that would be expected to support an enhanced wildlife and habitat biodiversity level. It would also allow the Base to readily respond to major changes in mission or to other factors not currently considered. This alternative also has the greatest potential for adverse impacts due to the increased level of management actions. Adverse impacts are not expected to occur because all of the activities performed would be to enhance the natural resources.

4.10.3 Alternative C Impacts

Implementation of Alternative C is more reactive compared to the other alternatives and would result in fewer and extremely minor ground disturbance management actions and significantly reduced cumulative impacts than Alternatives A and B. These include installing and maintaining: desert tortoise signs; desert tortoise exclusion fence; 5 new wildlife guzzlers; supplying water to 19 guzzlers; camera stations to collect wildlife data, bat roosts, and minor control of soil erosion. These types of management actions would result in positive cumulative impacts to the desert tortoise, game birds, increases the amount of data on wildlife presence and behavior, offsets loss of bat roosts from demolition of abandoned buildings known to contain maternity bat roosts, and improves stability of soils in small areas. Edwards AFB's ability to respond to changes in land-use requirements would also be limited under this alternative.

4.11 Findings and Conclusions

The decision to be made includes using any of the alternatives (depending on available funding to implement one of the Alternatives) to remain in compliance with all applicable federal and state laws and Air Force instructions and policies. While none of the alternatives were found to have significant impacts as defined by CEQ, full implementation of the management actions of each alternative where such actions are required would ensure the continued management and sustainment of natural resources while fully supporting the military mission.

There is a high likelihood of beneficial consequences associated with Alternatives A and B. Implementation of any of the alternatives would allow the Air Force to manage its natural resources at various levels based on receiving sufficient funds and still remain in compliance with all applicable federal and state laws and regulations. Implementing any of the alternatives would not constitute a major Federal action significantly affecting the quality of the environment. A FONSI is fully supported by this analysis.

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

Federal Agencies

Air Force Test Center Technical Library, 812 TSS/ENTL, Edwards AFB, California

Edwards Base Library, 412 FSS/FSDL, Edwards AFB, California

Headquarters, AFMC/CEV, Wright Patterson AFB, Ohio

NASA Library, Edwards AFB, California

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INRMP SCH Number 2014124001

INRMP EA SCH Number 2014124002

Native American Tribes

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Colorado River Indian Tribes, Parker, Arizona

Morongo Band of Mission Indians, Banning, California

San Manuel Band of Mission Indians, Highland, California

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APPENDIX A
REGULATORY REQUIREMENTS/GUIDANCE

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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.

The CAA and the CAAA-90 provided the legal framework to develop regulations controlling air pollution emissions from stationary and mobile sources in order to protect public health and welfare. Air quality regulations were first promulgated with the CAA and revised with the CAAA-90. Stationary sources at Edwards AFB typically include fixed sources such as generators powered by internal combustion engines, external combustion boilers, jet engine test cells, and spray paint booths. Mobile sources typically include motor vehicles, construction equipment, portable equipment and aircraft.

The Occupational Safety and Health Administration (OSHA) developed standards to promote a safe working environment. The 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 DoD workers (i.e., military and civilian). Independent contractors are responsible for meeting Cal-OSHA requirements. Statutory and regulatory requirements of the Federal OSHA and the 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.

Air Force Policy Directive (AFPD) 91-2, *Safety Programs*, states that the Air Force is committed to providing safe, healthful environments both for Air Force personnel and for those affected by Air Force operations. The Air Force must identify and control hazards to prevent mishaps. When mishaps do occur, the Air Force must learn the cause and take steps to ensure those mishaps are not repeated. This Directive establishes policies for the Air Force's approach to safety.

Air Force Instruction 32-1053, *Integrated Pest Management Program*, provides guidance for pest management programs at Air Force installations. It implements AFPD 32-10, *Installations and Facilities*, and DoDI 4150.07, *DoD Pest Management Program*.

Air Force Occupational Safety and Health Standard 48-20, *Occupational Noise and Hearing Conservation Program*, provides the criteria for the Air Force's minimum occupational health requirements.

Air Force Instruction 32-1053, *Integrated Pest Management Program*, implements AFPD 32-10, *Installations and Facilities*, and DoDI 4150.07, *DoD Pest Management Program*.

Pest management is conducted IAW the Installation Pest Management Plan, Edwards Air Force Base, CA (412 TW, 19 Feb 2014).

Air Force Instruction 32-7042, *Waste Management*, implements AFPD 32-70, *Environmental Quality*.

CERCLA is managed by the US EPA. It assigns liability to those responsible for the release of hazardous substances, regulates and oversees clean-up activities, and creates a trust fund to pay for the clean-up of hazardous substances when the person responsible cannot be identified.

The Hazardous Materials Transportation Act (HMTA) (49 USC 1801) is the Federal legislation that governs the transportation of hazardous materials in the nation.

The Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) (42 USC 11001-11050) was designed to promote emergency planning and preparedness at both State and local levels. It provides citizens and local governments with information regarding the potential hazards in their community. The Act requires the use of emergency planning and designates State and local governments as recipients for information regarding chemicals and toxins used in the community.

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) (7 USC 136-136y) establishes regulations for the proper use, storage, and disposal of pesticides. Pesticide management activities are subject to Federal regulations contained in 40 CFR 162, 165, 166, 170, and 171. Air Force Instruction 32-1053, *Integrated Pest Management Program*, implements AFPD 32-10, *Installations and Facilities*, and DoDI 4150.07, *DoD Pest Management Program*. This Instruction provides guidance for pest management at Edwards AFB.

Air Force Instruction 10-2501, *Air Force Emergency Management Program Planning and Operations*, implements AFPD 10-2, *Readiness*, AFPD 10-25, *Emergency Management*, AFPD 10-26, *Counter-Chemical, Biological, Radiological, and Nuclear Operations*, and AFPD 10-8, *Defense Support of Civil Authorities*, by helping users plan for and respond to DoD emergencies involving hazardous materials. It covers requirements for hazardous materials emergency planning, training, response, and reporting.

Air Force Instruction 32-7042, *Waste Management*, implements AFPD 32-70, *Environmental Quality*. It identifies compliance requirements for all solid and hazardous wastes, except radioactive waste.⁴ In the United States and its territories, use this guidance with applicable

⁴The applicable solid waste regulations are in Subtitle D of Title 40, Code of Federal Regulations (40 CFR) Parts 240 to 244, 257, and 258; for hazardous waste, the applicable regulations are in Subtitle C, 40 CFR 260-272.

Federal, State, and local standards for solid and hazardous waste. Specifically, it contains requirements for solid and hazardous waste characterization, training, accumulation, turn-in and disposal, as well as procedures for managing disposal contracts, inspections, permits, and recordkeeping.

Air Force Instruction 32-7086, *Hazardous Materials Management*, establishes procedures and standards that govern management of hazardous materials throughout the Air Force. It applies to all Air Force personnel who procure, use, or dispose of hazardous materials.

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, eggs, etc. Permits are required to remove these birds and their nests from their roosting and nesting areas.

The *Bald Eagle Protection Act* (BEPA) (16 USC 668-668d, 54 Stat. 250), as amended, provides for the protection of bald and golden eagles by prohibiting, except under certain specified conditions, the capturing, possession, and selling of such birds, their eggs, feathers, etc.

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, development, and maintenance of fish and wildlife resources on military reservations throughout the United States.

The *Fish and Wildlife Coordination Act* (FWCA) (16 USC 661-667e) authorizes the Secretaries of Agriculture and Commerce to provide assistance to and cooperate with Federal and State agencies to protect, rear, stock, and increase the supply of game and furbearing animals, as well as to study the effects of domestic sewage, trade, wastes, and other polluting substances on wildlife.

The *Animal Damage Control Act* (ADCA) (7 USC 426-426b), as amended, is administered by the Secretary of Agriculture and provides broad authority for investigation and control of mammalian predators, rodents, and birds.

The *Federal Noxious Weed Act of 1974* (FNWA) (7 USC 2801 et seq.), under the authority of the Secretary of Agriculture, establishes a Federal program to control the spread of noxious weeds.

The *Federal Insecticide, Fungicide, and Rodenticide Act* (FIFRA) (7 USC 136-136y) establishes regulations for the proper use, storage, and disposal of pesticides.

Executive Order (EO) 11988, *Floodplain Management*, requires that all Federal agencies provide leadership and take action to reduce the risk of flood loss; minimize impacts of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values of floodplains during the acquisition, management, and disposal of Federal lands.

Executive Order 11990, *Protection of Wetlands*, directs Federal agencies to avoid development in wetlands whenever there is a practicable alternative, and to avoid to the greatest extent possible, adverse impacts associated with the occupancy or modification of wetlands.

Executive Order 13112: *Invasive Species*, recognizes invasive, nonindigenous species as a problem and creates a multiagency structure and process for identifying gaps in Federal efforts to manage the problem. The Order is intended to support management activities that prevent the introduction of invasive plants, provide for their control, and minimize the economic, ecological, and human health impacts that invasive species cause.

Executive Order 13186 *Responsibilities of Federal Agencies To Protect Migratory Birds* states “Federal Agency Responsibilities. (a) Each Federal agency taking actions that have, or are likely to have, a measurable negative effect on migratory bird populations is directed to develop and implement, within 2 years, a Memorandum of Understanding (MOU) with the Fish and Wildlife Service (Service) that shall promote the conservation of migratory bird populations.”

Department of Defense Instruction (DoDI) 4150.07, *DoD Pest Management Program*, outlines the policies, responsibilities, and procedures for implementation of pest management programs, and requires the certification of pest managers. The Technical Information Memorandum (TIM), a guidance supplement to DoDI 4150.07, outlines specific criteria and operational procedures for the implementation of pest management programs.

DoDI 4715.03, *Natural Resources Conservation Program*, prescribes policies and procedures for an integrated management program of natural resources on DoD property. Enforcement of laws primarily aimed at protecting natural resources and recreation activities that depend on natural resources, is an integral part of a natural resources program and shall be coordinated with, or under the direction of, the natural resources manager for the affected area.

Air Force Instruction 32-1053, *Integrated Pest Management Program*, addresses policies, responsibilities, and procedures for pest management at Air Force installations.

Air Force Instruction 32-7064, *Integrated Natural Resources Management*, implements AFPD 32-70, *Environmental Quality* and DoDI 4715.03, *Natural Resources Conservation Program*. Air Force Instruction 32-7064 explains how to manage natural resources on Air Force property. The INRMP is a key tool for managing the installation’s natural resources.

The NHPA requires federal agencies to consider historic properties in planning activities. It specifies the coordination process with the SHPO in order to establish checks and balances. Section 106 of the NHPA requires Federal agencies to take into account the effects of their undertakings on historic properties and provide the ACHP an opportunity to comment.

Archeological and Historical Preservation Act of 1974 ensures that the Federal agency notifies the Secretary of the Interior where significant cultural data are encountered during the execution of any federal undertaking.

Title 36 Code of Federal Regulations Part 800, Protection of Historic Properties, defines how Federal agencies meet the statutory responsibilities described in the NHPA. This procedure

addresses the relationship to other provisions of the NHPA and the timing for accomplishing Section 106 review.

Department of Defense Instruction 4715.16, Cultural Resources Management, addresses the management and maintenance of cultural resources under DOD control. It supports sustainable management through a comprehensive program of historic preservation, mission support, responsible stewardship and consultation with internal and external stakeholders.

AFI 32-7065, *Cultural Resources Management Program*, sets forth Air Force guidelines for protecting and managing cultural resources on property affected by Air Force operations in the United States and its territories.

The 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 Part 800, *Protection of Historic Properties*; and AFI 32-7065, *Cultural Resources Management Program*, is coordinated by the Base Historic Preservation Officer (BHPO).

The *Archaeological Resources Protection Act* (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 and imprisonment.

The *Native American Graves Protection and Repatriation Act* (NAGPRA) (25 USC 3001 et seq.) requires Federal agencies and institutions (i.e., 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. It 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 *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 470) requires all agencies to report to the Secretary of the Interior if any of their projects may cause the loss of “significant scientific, pre-historical, 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.

Cultural resources at Edwards AFB may include sites, buildings, structures and objects with national, state or local cultural value. This value may be attributed to the resource by subject matter professionals or interested parties. Federal law has placed the burden of identifying, evaluating and protecting cultural resources found on federal lands or those affected by federal programs and funding, on the federal land owners. As a federal agency owning federal land, Edwards AFB is required to identify cultural resources present on the installation. Archeological resources are initially identified during field survey, with evaluations conducted through excavation of sites and extensive research. Identification of historic facilities begins with a review of the building's records, construction, historical and current function and association to various military programs. Further evaluations entail extensive research and documentation of the building or structure. The level of protection that Edwards AFB is required to extend a resource depends upon the complexity of the resource, the basis for its historic significance, its integrity and rarity and the level of threat to the resource. The Department of Interior has established Standards for the Treatment of Historic Properties, to which Edwards AFB must comply to minimize the potential for a finding of adverse effect.

Natural resource management ground disturbing activities in areas of known cultural resource sites that may be eligible IAW the NHPA. The Integrated Cultural resources Management Plan (ICRMP) and its accompanying Programmatic Agreement (PA) between the United States Air Force and the *California State Historic Preservation Officer Regarding Implementation of the Air Force Test Center Mission and the Integrated Cultural Resources Management Plan for Edwards Air Force Base, California* (2012) collectively provide the streamlined procedures for conducting in-house Section 106 review, per the NHPA. If during this internal Section 106 review, a proposed undertaking is found to have the potential to adversely affect a historic resource and neither alternatives nor avoidance measures reduce the effect, the SHPO must be notified. Immediate consultation with the SHPO begins and results in a memorandum of agreement (MOA) stipulating acceptable mitigating treatments.

Department of Defense Instruction (DoDI) 1015.10, *Military Morale, Welfare, and Recreation (MWR) Programs*, implements policy, assigns responsibilities, and prescribes procedures for operating and managing military MWR programs. DoDI 1015.10 requires the establishment of a well-rounded MWR program that contributes to mission readiness and improves productivity through programs promoting fitness, esprit de corps, and quality of life.

Air Force Instruction 34-110, *Air Force Outdoor Recreation Programs and Procedures*, provides guidance for outdoor recreation programs.

The Edwards AFB Instruction (EAFBI) 31-218, *Motor Vehicle Traffic Supervision* serves as the regulation for three ORV areas.

Edwards AFB natural resource staff is drafting a new instruction, Edwards Air Force Base Instruction 32-8 (EAFBI 32-8), *Management of Hunting, Fishing and Volunteer Program* which will establish policies and explain procedures for the control of hunting and fishing.

AFI 34-116, *Air Force Golf Course Program*, provides guidance and procedures for Air Force golf programs.

APPENDIX B
AIR CONFORMITY LETTER

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 412TH TEST WING (AFMC)
EDWARDS AIR FORCE BASE CALIFORNIA

DEC 18 2014

MEMORANDUM FOR RECORD

FROM: 412 CEG/CEVC

12 Laboratory Road, Building 4231

Edwards AFB, CA 93524

SUBJECT: Clean Air Act Conformity Statement for Control No. 12-0006, Environmental Assessment for the Integrated Natural Resources Management Plan, Edwards AFB, CA

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: Eastern Kern Air Pollution Control District (EKAPCD), 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 U.S.C. Part 7506 (c), the portion of the Proposed Action regulated by the EKAPCD is located in a Marginal Nonattainment area for ozone. The de minimis level set for EKAPCD for emissions of ozone precursor pollutants ([VOCs or oxides of nitrogen [NO_x]], in accordance with Title 40 CFR Part 51.853/93.153 (b)(1) and EKAPCD Rule 210.7 is up to 100 tons per pollutant (VOCs or NO_x) per year per action. The portion of the Proposed Action regulated by the MDAQMD and AVAQMD is located in a Serious Nonattainment level for ozone. The de minimis level set for MDAQMD and AVAQMD for emissions of VOCs or NO_x, IAW 40 CFR 51.853/93.153 (b)(1), MDAQMD Rule 2002, and AVAQMD Regulation XIII, is up to 25 tons per ozone precursor pollutant per year per action.

c. It has been determined that the relevant air emissions for this action are 0 tons of NO_x and 9 tons of VOCs during any given year (emissions for individual years will be the same). The direct and indirect emissions, when totaled, are less than the de minimis amounts specified in 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 Mr. John Vidic at (661) 277-1457.

A handwritten signature in black ink, appearing to read "M. G. Minnecci".

MARC G. MINNECCI, NH-III
Acting Chief, Compliance Branch

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APPENDIX C
AIR EMISSION SOURCES

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AIR EMISSION SOURCES AT EDWARDS AFB

Vehicle and equipment operation, prescribed burns, and the use of pesticides are the three sources of VOCs identified with the proposed actions associated with natural resource management at Edwards AFB. The operation of motor vehicles and equipment is considered a significant source of ozone precursors. The combustion of petroleum products result in the emissions of VOCs, and a much smaller amount of non-reactive organic compounds, the sum of which is commonly referred to as total organic gases. Emission factors for the operation of motor vehicles have been developed for total organic gases. As a conservative approach, all of the calculated total organic gases emissions will be assumed to be VOCs. For the purpose of this study, emissions of VOCs and NO_x were quantified for the increased operation of both privately owned and Government owned vehicles and weed removal equipment. Similarly, calculations for prescribed burns assumed a maximum burn of 22 acres per year and pesticide VOCs assumed that the total volume used became VOCs.

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Emission Summary:

		Emissions from Vehicle Exhaust (ton/yr)						
Location	Equipment	ROG	CO	NO_x	SO_x	PM10	PM2.5	CO2
Guzzlers	Small Bobcat	0.000	0.000	0.000	0.000	0.000	0.000	0.015
Subtotal		0.00	0.00	0.00	0.00	0.00	0.00	0.01
Branch Pond	Excavator	0.000	0.000	0.000	0.000	0.000	0.000	0.007
Branch Pond	Dump Truck	0.000	0.001	0.006	0.000	0.000	0.000	1.260
Subtotal		0.00	0.00	0.01	0.00	0.00	0.00	1.27
Piute Ponds	Scraper	0.000	0.001	0.007	0.000	0.000	0.000	1.412
Piute Ponds	Excavator	0.000	0.000	0.000	0.000	0.000	0.000	0.003
Piute Ponds	Excavator	0.000	0.000	0.000	0.000	0.000	0.000	0.014
Piute Ponds	Excavator - new ponds	0.000	0.000	0.000	0.000	0.000	0.000	0.009
Piute Ponds	Dump Truck	0.003	0.013	0.069	0.000	0.005	0.004	14.180
Piute Ponds	Front end Loader	0.000	0.001	0.007	0.000	0.000	0.000	1.412
Piute Ponds	Tractor	0.000	0.000	0.002	0.000	0.000	0.000	0.353
Subtotal		0.00	0.02	0.08	0.00	0.01	0.00	17.38
General Use & All Projects	Pick-up Truck	0.068	0.673	0.179	0.001	0.006	0.002	85.828
General Use & All Projects	Water Truck (storage tank)	0.001	0.003	0.015	0.000	0.001	0.001	3.064
Total		0.1	0.7	0.3	0.0	0.0	0.0	107.5

Emission Summary (Continued):

Location	Equipment	URBEMIS Model Emissions from Fugitives (ton/yr)			EPA Model Emissions from Fugitives (ton/yr)		
		PM10	PM	PM2.5	PM10	PM	PM2.5
Guzzlers	Small Bobcat	0.00	0.00	0.00	0.0	0.0	0.0
Subtotal		0.00	0.00	0.00	0.00	0.00	0.00
Branch Pond	Excavator	1.18	2.28	0.38	1.7	3.4	0.6
Branch Pond	Dump Truck	0.00	0.00	0.00	0.2	0.3	0.1
Subtotal		1.18	2.28	0.38	1.91	3.70	0.70
Piute Ponds	Scraper	4.80	9.23	1.68	0.8	2.0	0.3
Piute Ponds	Excavator	3.38	6.51	1.08	0.7	1.4	0.3
Piute Ponds	Excavator	6.77	13.02	2.17	5.2	10.1	1.8
Piute Ponds	Excavator - new ponds	1.02	1.95	0.32	0.5	1.1	0.2
Piute Ponds	Dump Truck	0.00	0.00	0.00	1.5	3.1	0.8
Piute Ponds	Front end Loader	3.00	5.77	1.05	0.9	2.1	0.2
Piute Ponds	Tractor	0.75	1.44	0.26	0.5	1.1	0.2
Subtotal		19.72	37.92	6.57	10.26	21.00	3.69
General Use & All Projects	Pick-up Truck	0.00	0.00	0.00	0.4	1.8	0.0
General Use & All Projects	Water Truck (storage tank)	0.00	0.00	0.00	0.0	0.0	0.0
Total		21	40	7	13	27	4

Emission Summary (Continued):

Location	Equipment	Emissions from Wood Combustion (ton/yr)						
		ROG	CO	NOx	SOx	PM10	PM2.5	CO2
Guzzlers	Small Bobcat							
Subtotal		0	0	0	0	0	0	0
Branch Pond	Excavator							
Branch Pond	Dump Truck							
Subtotal		1	2	0	0	0	0	38
Piute Ponds	Scraper							
Piute Ponds	Excavator							
Piute Ponds	Excavator							
Piute Ponds	Excavator - new ponds							
Piute Ponds	Dump Truck							
Piute Ponds	Front end Loader							
Piute Ponds	Tractor							
Subtotal		8	23	0	0	3	1	377
General Use & All Projects	Pick-up Truck							
General Use & All Projects	Water Truck (storage tank)							
Total		9	25	0	0	3	1	415

Emission Summary (Concluded):

Total Emissions (ton/yr)							
Location	ROG	CO	NOx	SOx	PM10	PM2.5	CO2
Guzzlers	0	0	0	0	0	0	0
General Use & All Projects	0.1	0.7	0.2	0.0	0.0	0.0	88.9
Branch Pond (EKAPCD)	1	2	0	0	2	1	39
Piute Ponds (AVAQMD)	8	23	0	0	13	5	395
Total	9	26	0	0	15	6	523
Conformity Applicability Threshold for EKAPCD	100	N/A	100	N/A	100	100	25000
Conformity Applicability Threshold for AVAQMD and MDAQMD	25	N/A	25	N/A	15	15	10000

Data Input:

Location	Equipment	No. of Equipment	Hours per Day	Days/ yr	Off - Road	Paved Road	Area Disturbed (acres)	Maximum cut depth (ft)	AG Burn	
									Acreage Burned (over 5 years)	Max Acreage (per year)
Guzzlers	Small Bobcat	1	2	1	100%	0%	0.03	1		
Branch Pond	Excavator	1	8	6	100%	0%	14	1	10	2
Branch Pond	Dump Truck	1	8	6	100%	0%	14			
Piute Ponds	Scraper	1	8	24	100%	0%	40	1	100	20
Piute Ponds	Excavator	1	8	24	100%	0%	4	10		
Piute Ponds	Excavator	1	8	24	100%	0%	40	2		
Piute Ponds	Excavator - new ponds	1	8	24	100%	0%	4	3		
Piute Ponds	Dump Truck	1	8	12	100%	0%	40			
Piute Ponds	Front end Loader	1	8	24	100%	0%	25	1		
Piute Ponds	Tractor	1	8	6	100%	0%	25	1		
General Use & All Projects	Pick-up Truck	3	4	365	80%	20%	50			
General Use & All Projects	Water Truck (storage tank)	1	8	10	80%	20%	50			
Total		14	86	526	97%	3%	306	20	110	22

Assumptions:

Water trucks are used to haul water, not applied for PM mitigation.

No waste production, no debris carryout, just earth movement.

Equipment used for dredging ponds, removing plants, creating water channels.

Controlled ag burns only contain plant materials, no man-made waste materials.

Assume Area of the Guzzlers = 1/2 Branch Pond.

Soil is composed of silt, clay, and has high moisture content.

Total area disturbed = 400 acres over 5 years.

Project include maximum 10 ft trench for Piute Ponds but not over full area. Assume trench is 5% of total area.

Project includes 5 new ponds at 3 ft depth for Piute Ponds. Assume new ponds covers 10% of the total area.

Path disturbed by Dump trucks, trucks, water trucks = Distance (circumference) around ponds.

Distance on road = 90 mi per day (trip to AFRL and back).

Ag burn permitted hours 10am - 5pm, 10 acres or more need to submit a burn plan.

Parameters:

Location	Equipment	No. of Equipment	Equipment Width or Reach (ft)	Capacity (CY for one load)	Speed (mi/hr)	Efficiency factor (includes number of passes)	Maximum Rate per piece of equip. (CY/hr)
Guzzlers	Small Bobcat	1	6	0.5	5	1.2	1760
Branch Pond	Excavator	1	24	3	20 s/cycle	0.9	480
Branch Pond	Dump Truck	1	6	20	10	0.8	2720
Piute Ponds	Scraper	1	10	20	5	1.2	2933
Piute Ponds	Excavator	1	24	3	20 s/cycle	0.9	480
Piute Ponds	Excavator	1	24	3	20 s/cycle	0.9	480
Piute Ponds	Excavator - new ponds	1	24	3	20 s/cycle	0.9	480
Piute Ponds	Dump Truck	1	6	20	10	0.8	2720
Piute Ponds	Front end Loader	1	10	5	5	1.2	2933
Piute Ponds	Tractor	1	10	5	5	1.2	2933
General Use & All Projects	Pick-up Truck	3	5	3	10	0.8	363
General Use & All Projects	Water Truck	1	6	20	10	0.8	104
Total		14					18387

1 - Distance for Trucks one length, distance does not include the number of trips or number of vehicles. All others are the total distance for one vehicle to cover area disturbed.

Parameters (Continued):

Location	Equipment	Estimated Disturbed Area				Estimated Hrs to complete
		Grading (CY)	Cut (CY)	Bank fill (CY)	Extra earth moved (CY)	
Guzzlers	Small Bobcat	17				0
Branch Pond	Excavator	-	20077	13542	6535	42
Branch Pond	Dump Truck	-			6535	2
Piute Ponds	Scraper	19360				7
Piute Ponds	Excavator	-	57363	38692	18671	120
Piute Ponds	Excavator	-	114726	77384	37342	239
Piute Ponds	Excavator - new ponds	-	17209	11608	5601	36
Piute Ponds	Dump Truck	-			61615	23
Piute Ponds	Front end Loader	12100	-			4
Piute Ponds	Tractor	12100	-			4
General Use & All Projects	Pick-up Truck	-				4380
General Use & All Projects	Water Truck	-	-		124	1
Total		43577	209375	141225	136423	4857

1 - Distance for Trucks one length, distance does not include the number of trips or number of vehicles. All others are the total distance for one vehicle to cover area disturbed.

Parameters (Concluded):

Location	Equipment	Estimated Scope			Off-road	On-road	VMT	
		Allowable Hours per Day	Projected Days/ Yr	Number of Trips	Distance (mi)	Distance (mi)	VMT (mi)	VMT (mi/day) per vehicle
Guzzlers	Small Bobcat	2	0	1	0.1	0	0.1	0.1
Branch Pond	Excavator	8	5	1	5	0	5	1
Branch Pond	Dump Truck	8	0.3	327	1	0	171	171
Piute Ponds	Scraper	8	1	1	40	0	40	48
Piute Ponds	Excavator	8	15	1	1	0	1	0.1
Piute Ponds	Excavator	8	30	1	14	0	14	0.5
Piute Ponds	Excavator - new ponds	8	4	1	1	0	1	0.3
Piute Ponds	Dump Truck	8	3	3081	1	0	2730	964
Piute Ponds	Front end Loader	8	1	1	25	0	25	48
Piute Ponds	Tractor	8	1	1	25	0	25	48
General Use & All Projects	Pick-up Truck	4	365	365	40	10	37230	102
General Use & All Projects	Water Truck	8	0.15	6	40	10	250	250
Total		86	425	3787	192	20	40492	1633

1 - Distance for Trucks one length, distance does not include the number of trips or number of vehicles. All others= the total distance for one vehicle to cover area disturbed.

Assumptions:

Cut/fill = (SQ Ft * Depth ft)*efficiency; Grading = (SQFT)* Depth/4 ft *efficiency, Assume 1/4 of fill depth is topsoil grading, 2 passes included in efficiency.

2 passes for graders/loaders/tractors @ 60% efficiency; excavators included bucket fill, swell volume, and worker efficiency factors @ 20 s/cycle.

Dump truck rate = 0.85 * excavator rate

Water Truck capacity = 4000 gallons, Max rate = 350 gpm

Distance off-road by Dump trucks, trucks, water trucks = Distance (circumference) around ponds.

Distance on-road = 10 mi to Rosemond

Distance off-road for equipment = Area disturbed using vehicle width as increments

Assume Volume excavated at ponds is used to build up bank, Bank Vol = tan rdry/tan rw * Cut Vol, angle of repose for sandwet = 45 degrees, sanddry = 34 degrees

Dump volume = Difference between Cut Vol and Bank fill, Max rate for truck = capacity of truck * cycle rate of excavator

VMT = distance * number of trips to move volume *number of equipment

Fugitive PM Emissions:

			CARB Model URBEMIS									
Location	No of Equipment	Type	Source	PM10 ²	UOM	PM10 tons / yr	PM	UOM	PM tons / yr	PM2.5 ²	UOM	PM2.5 ton / yr
				Guzzlers	1	Small Bobcat	Emissions from Site Grading ¹	0.1100	ton / acre-mo	0.00	0.2115	ton / acre-mo
Subtotal		tons / yr				0.00			0.00			0.00
Branch Pond	1	Excavator	Emissions from Cut/Fill ¹	0.0590	ton / 1000 CY	1.18	0.113	ton / 1000 CY	2.28	0.019	ton / 1000 CY	0.38
Subtotal		tons / yr				1.18			2.28			0.38
Branch Pond	1	Dump Truck										
Subtotal		tons / yr				0.00			0.00			0.00
Total Branch Pond		tons / yr				1.18			2.28			0.38
Piute Ponds	1	Scraper	Emissions from Site Grading ¹	0.1100	ton / acre-mo	4.80	0.2115	ton / acre-mo	9.23	0.0385	ton / acre-mo	1.68
Subtotal		tons / yr				4.80			9.23			1.68
Piute Ponds	1	Excavator	Emissions from Cut/Fill ¹	0.0590	ton / 1000 CY	3.38	0.113	ton / 1000 CY	6.51	0.019	ton / 1000 CY	1.08
Subtotal		tons / yr				3.38			6.51			1.08
Piute Ponds	1	Excavator	Emissions from Cut/Fill ¹	0.0590	ton / 1000 CY	6.77	0.113	ton / 1000 CY	13.02	0.019	ton / 1000 CY	2.17
Subtotal		tons / yr				6.77			13.02			2.17
Piute Ponds	1	Excavator - new ponds	Emissions from Cut/Fill ¹	0.0590	ton / 1000 CY	1.02	0.113	ton / 1000 CY	1.95	0.019	ton / 1000 CY	0.32

Subtotal		tons / yr				1.02			1.95			0.32
Piute Ponds	1	Dump Truck										
Subtotal		tons / yr				0.00			0.00			0.00
Piute Ponds	1	Front end Loader	Emissions from Site Grading ¹	0.1100	ton / acre-mo	3.00	0.2115	ton / acre-mo	5.77	0.0385	ton / acre-mo	1.05
Subtotal		tons / yr				3.00			5.77			1.05
Piute Ponds	1	Tractor	Emissions from Site Grading ¹	0.1100	ton / acre-mo	0.75	0.2115	ton / acre-mo	1.44	0.0385	ton / acre-mo	0.26
Subtotal		tons / yr				0.75			1.44			0.26
Total Piute Ponds		tons / yr				19.72			37.92			6.57
General Use & All Projects	3	Pick-up Truck										
General Use & All Projects	1	Water Truck (storage tank)										
Total Project		tons / yr				20.90			40.20			6.95

1.35 tons/CY = Cut/fill density average----median of AP-42 Appendix A density for sand & gravel.

9.2%= silt content (Soil is composed of silt, clay, and has high moisture content)----- AP 42.13.2.4-1

50% = Moisture content of soil----- AP 42.13.2.4-1. Equation modified to reflect an actual moisture content of 50%.

9= Mean wind speed-----AP 42.13.2.4-4. Adjusted wind speed to reflect actual conditions.

1 - URBEMIS2007

Demo PM10 =EF*Volume/demo days, SCAQMD CEQA Handbook 1993;

Site Grading PM10 = 0.11 tons/acre-month with water & PM = 0.225 ton/acre-month, SCAQMD Midwest Research Institute <http://www.arb.ca.gov/ei/areasrc/fullpdf/full7-7.pdf>;

2 - CARB Characterization of Ambient PM10 and PM2.5 Technical Report 6/2005 study <http://www.arb.ca.gov/pm/pmmeasures/pmch05/mojd05.pdf>

3 - AP-42 Table 13.2.3-1 Construction based on Fugitives from Mining activities **Expect emissions are over estimated for industrial demolition application Dozer EF in Table 11.9-1, PM (lb/hr) = 5.7(s)^{1.2} / M^{1.3}, PM10 = 0.75* 1.0(s)^{1.5} / M^{1.4}, PM2.5 = 0.105*PM; where s = silt, M = moisture

Grading EF in Table 11.9-1, PM (lb/VMT) = 0.040(S)^{2.5}, PM10 = 0.60*0.051(S)^{2.0}, PM2.5 = 0.031*PM; where S = speed mph

EF in Table 11.9-4, Scraper PM = 0.058 lb/ton, Over PM = 0.012, Truck load = 0.037, Truck unload = 0.066, Scraper unload = 0.04, Wind = 0.38
 Debris Loading in 13.2.4, PMk (lb/ton) = k (0.0032)*(U/5)^{1.3}/(M/2)^{1.4}, where k=0.74 for PM, k=0.35 for PM10, k = 0.053 for PM2.5, and u = 11 mph,
 M = moisture

Unpaved Roads in 13.2.2, PM (lb/VMT) = k(s/12)^a(S/30)^d/(M/0.5)^c - C, where a=1, s=silt, S=speed, M=moisture, k=6.0, c=0.3 d=0.3, C=0.00047 for PM,
 k=1.8, c=0.2,d=0.5, C=0.00047 for PM10, k=0.18, c=0.2, d=0.5, C=0.00036 for PM2.5

Fugitive PM Emissions (Continued):

Location	No of Equipment	Type	EPA Model									
			Source	PM10 ²	UOM	PM10 tons / yr	PM	UOM	PM tons / yr	PM2.5 ²	UOM	PM2.5 ton / yr
Guzzlers	1	Small Bobcat	Emissions from Site Grading ³	0.7650	lb/VMT	0.000	2.2361	lb/VMT	0.000	0.06932	lb/VMT	0.000
			Emissions from Topsoil Scraping ³	0.030	lb/ton	0.000	0.058	lb/ton	0.001	1.06E-02	lb/ton	0.000
			Emissions from Scraper Unloading ³	0.021	lb/ton	0.000	0.040	lb/ton	0.000	7.28E-03	lb/ton	0.000
			Emissions from Unpaved Roads/Scraping ³	0.0052	lb/VMT	0.00000	0.026	lb/VMT	0.00000	0.00020	lb/VMT	0.000000
Subtotal		tons / yr				0.00			0.00		0.000	
Branch Pond	1	Excavator	Emissions from Bulldozing Overburden ³	0.055	lb/hr	0.00	0.80	lb/hr	0.02	0.084	lb/hr	0.00
			Emissions from Overburden replacement ³	0.006	lb/ton	0.085	0.012	lb/ton	0.163	2.18E-03	lb/ton	0.030
			Emissions from wind erosion of exposed areas ³	0.198	tons / acre - yr	1.66	0.38	tons / acre - yr	3.19	0.06916	tons / acre - yr	0.58
Subtotal		tons / yr				1.74			3.37		0.61	
Branch Pond	1	Dump Truck	Emissions from Debris Loading/Unloading ³	0.0167	lb/ton	0.074	0.04	lb/ton	0.156	0.012	lb/ton	0.053
			Emissions from Truck Loading ³	0.019	lb/ton	0.085	0.037	lb/ton	0.163	0.007	lb/ton	0.030
			Emissions from Truck Unloading ³	0.001	lb/ton	0.005	0.002	lb/ton	0.009	0.0004	lb/ton	0.002
Subtotal		tons / yr				0.16			0.33		0.084	

Total Branch Pond		tons / yr				1.91			3.70			0.70
Piute Ponds	1	Scraper	Emissions from Site Grading ³	0.7650	lb/VMT	0.441	2.2361	lb/VMT	1.288	0.06932	lb/VMT	0.040
			Emissions from Topsoil Scraping ³	0.030	lb/ton	0.394	0.058	lb/ton	0.758	1.06E-02	lb/ton	0.138
			Emissions from Scraper Unloading ³	0.021	lb/ton	0.000	0.040	lb/ton	0.000	7.28E-03	lb/ton	0.095
			Emissions from Unpaved Roads/Scraping ³	0.0052	lb/VMT	0.00297	0.026	lb/VMT	0.00000	0.00020	lb/VMT	0.000000
Subtotal		tons / yr				0.84			2.05			0.27
Piute Ponds	1	Excavator	Emissions from Bulldozing Overburden ³	0.055	lb/hr	0.00	0.80	lb/hr	0.05	0.084	lb/hr	0.01
			Emissions from Overburden replacement ³	0.006	lb/ton	0.242	0.012	lb/ton	0.465	2.18E-03	lb/ton	0.085
			Emissions from wind erosion of exposed areas ³	0.198	tons / acre - yr	0.47	0.38	tons / acre - yr	0.91	0.06916	tons / acre - yr	0.17
Subtotal		tons / yr				0.72			1.42			0.26
Piute Ponds	1	Excavator	Emissions from Bulldozing Overburden ³	0.055	lb/hr	0.01	0.80	lb/hr	0.10	0.084	lb/hr	0.01
			Emissions from Overburden replacement ³	0.006	lb/ton	0.483	0.012	lb/ton	0.929	2.18E-03	lb/ton	0.169
			Emissions from wind erosion of exposed areas ³	0.198	tons / acre - yr	4.74	0.38	tons / acre - yr	9.11	0.06916	tons / acre - yr	1.66
Subtotal		tons / yr				5.23			10.14			1.84
Piute Ponds	1	Excavator - new ponds	Emissions from Bulldozing Overburden ³	0.055	lb/hr	0.00	0.80	lb/hr	0.01	0.084	lb/hr	0.00
			Emissions from Overburden replacement ³	0.006	lb/ton	0.072	0.012	lb/ton	0.139	2.18E-03	lb/ton	0.025
			Emissions from	0.198	tons /	0.47	0.38	tons /	0.91	0.06916	tons /	0.17

			wind erosion of exposed areas ³		acre - yr			acre - yr			acre - yr	
Subtotal			tons / yr			0.55			1.07			0.19
Piute Ponds	1	Dump Truck	Emissions from Debris Loading/Unloading ³	0.0167	lb/ton	0.697	0.04	lb/ton	1.473	0.012	lb/ton	0.498
			Emissions from Truck Loading ³	0.019	lb/ton	0.800	0.037	lb/ton	1.539	0.007	lb/ton	0.280
			Emissions from Truck Unloading ³	0.001	lb/ton	0.043	0.002	lb/ton	0.083	0.0004	lb/ton	0.015
Subtotal			tons / yr			1.54			3.09			0.79
Piute Ponds	1	Front end Loader	Emissions from Site Grading ³	0.7650	lb/VMT	0.441	2.2361	lb/VMT	1.288	0.06932	lb/VMT	0.040
			Emissions from Topsoil Scraping ³	0.030	lb/ton	0.246	0.058	lb/ton	0.474	1.06E-02	lb/ton	0.086
			Emissions from Scraper Unloading ³	0.021	lb/ton	0.170	0.040	lb/ton	0.327	7.28E-03	lb/ton	0.059
			Emissions from Unpaved Roads/Scraping ³	0.0052	lb/VMT	0.003	0.026	lb/VMT	0.015	0.00020	lb/VMT	0.000
Subtotal			tons / yr			0.86			2.10			0.19
Piute Ponds	1	Tractor	Emissions from Site Grading ³	0.7650	lb/VMT	0.110	2.2361	lb/VMT	0.322	0.06932	lb/VMT	0.010
			Emissions from Topsoil Scraping ³	0.030	lb/ton	0.246	0.058	lb/ton	0.474	1.06E-02	lb/ton	0.086
			Emissions from Scraper Unloading ³	0.021	lb/ton	0.170	0.040	lb/ton	0.327	7.28E-03	lb/ton	0.059
			Emissions from Unpaved Roads/Scraping ³	0.0052	lb/VMT	0.001	0.026	lb/VMT	0.004	0.00020	lb/VMT	0.000
Subtotal			tons / yr			0.53			1.13			0.16
Total Piute Ponds			tons / yr			10.26			21.00			3.69
General Use & All Projects	3	Pick-up Truck	Emissions from Unpaved Roads/Scraping ³	0.0075	lb/VMT	0.419	0.033	lb/VMT	1.821	0.00044	lb/VMT	0.024
General Use & All Projects	1	Water Truck (storage)	Emissions from Unpaved Roads/Scraping ³	0.0075	lb/VMT	0.009	0.033	lb/VMT	0.041	0.00044	lb/VMT	0.001

		tank)										
Total Project		tons / yr				12.60				26.56		4.41

1.35 tons/CY = Cut/fill density average----median of AP-42 Appendix A density for sand & gravel.

9.2%= silt content (Soil is composed of silt, clay, and has high moisture content)----- AP 42.13.2.4-1

50% = Moisture content of soil----- AP 42.13.2.4-1. Equation modified to reflect an actual moisture content of 50%.

9= Mean wind speed-----AP 42.13.2.4-4. Adjusted wind speed to reflect actual conditions.

1 - URBEMIS2007

Demo PM10 =EF*Volume/demo days, SCAQMD CEQA Handbook 1993;

Site Grading PM10 = 0.11 tons/acre-month with water & PM = 0.225 ton/acre-month, SCAQMD Midwest Research Institute
<http://www.arb.ca.gov/ei/areasrc/fullpdf/full7-7.pdf>;

2 - CARB Characterization of Ambient PM10 and PM2.5 Technical Report 6/2005 study <http://www.arb.ca.gov/pm/pmmeasures/pmch05/mojd05.pdf>

3 - AP-42 Table 13.2.3-1 Construction based on Fugitives from Mining activities **Expect emissions are over estimated for industrial demolition application

Dozer EF in Table 11.9-1, PM (lb/hr) = 5.7(s)^{1.2} / M^{1.3}, PM10 = 0.75* 1.0(s)^{1.5} / M1.4, PM2.5 = 0.105*PM; where s = silt, M = moisture

Grading EF in Table 11.9-1, PM (lb/VMT) = 0.040(S)2.5, PM10 = 0.60*0.051(S)2.0, PM2.5 = 0.031*PM; where S = speed mph

EF in Table 11.9-4, Scraper PM = 0.058 lb/ton, Over PM = 0.012, Truck load = 0.037, Truck unload = 0.066, Scraper unload = 0.04, Wind = 0.38

Debris Loading in 13.2.4, PMk (lb/ton) =k (0.0032)*(U/5)^{1.3}/(M/2)^{1.4}, where k=0.74 for PM, k=0.35 for PM10, k = 0.053 for PM2.5, and u = 11 mph,
M = moisture

Unpaved Roads in 13.2.2, PM (lb/VMT) = k(s/12)^a(S/30)^d/(M/0.5)^c - C, where a=1, s=silt, S=speed, M=moisture, k=6.0, c=0.3 d=0.3, C=0.00047 for PM,
k=1.8, c=0.2,d=0.5, C=0.00047 for PM10, k=0.18, c=0.2, d=0.5, C=0.00036 for PM2.5

Emissions Due to Equipment and Vehicle Exhaust:

Assumptions:

Operating Hours from data input tab

HP is aggregated, speed is aggregated, assume equipment is T6 in-state small construction category

Assume 100% load factor

EFs include emissions from start, running and idling exhaust. In addition, the PM10 emission factors include tire and brake wear.

Emissions Due to Equipment and Vehicle Exhaust (Continued):

Location	Equipment Used				Emission Factors* (lb/mile)						
	Equipment	Amount	Class	VMT / hr	ROG	CO	NOx	SOx	PM10	PM2.5	CO2
Guzzlers	Small Bobcat	1	T6 - small	0.03	0.0006	0.0022	0.0119	0.0000	0.0009	0.0006	2.4510
Branch Pond	Excavator	1	T6 - small	0.12	0.0006	0.0022	0.0119	0.0000	0.0009	0.0006	2.4510
Branch Pond	Dump Truck	1	T6 - small	21.41	0.0006	0.0022	0.0119	0.0000	0.0009	0.0006	2.4510
Piute Ponds	Scraper	1	T6 - small	6.00	0.0006	0.0022	0.0119	0.0000	0.0009	0.0006	2.4510
Piute Ponds	Excavator	1	T6 - small	0.01	0.0006	0.0022	0.0119	0.0000	0.0009	0.0006	2.4510
Piute Ponds	Excavator	1	T6 - small	0.06	0.0006	0.0022	0.0119	0.0000	0.0009	0.0006	2.4510
Piute Ponds	Excavator - new ponds	1	T6 - small	0.04	0.0006	0.0022	0.0119	0.0000	0.0009	0.0006	2.4510
Piute Ponds	Dump Truck	1	T6 - small	120.53	0.0006	0.0022	0.0119	0.0000	0.0009	0.0006	2.4510
Piute Ponds	Front end Loader	1	T6 - small	6.00	0.0006	0.0022	0.0119	0.0000	0.0009	0.0006	2.4510
Piute Ponds	Tractor	1	T6 - small	6.00	0.0006	0.0022	0.0119	0.0000	0.0009	0.0006	2.4510
General Use & All Projects	Pick-up Truck	3	LHD1 - Gas	76.50	0.0012	0.0121	0.0032	0.0000	0.0001	0.0000	1.5369
General Use & All Projects	Water Truck (storage tank)	1	T6 - small	31.25	0.0006	0.0022	0.0119	0.0000	0.0009	0.0006	2.4510
ALL	Total	14		267.9							

*EF from CARB EF Database EMFAC2011, (<http://www.arb.ca.gov/emfac/>) Mojave Desert Air Basin, Annual Season, Aggregated fleet & Speed, 2014 data

Emissions Due to Equipment and Vehicle Exhaust (Continued):

Location	Equipment Used				Emissions (lb/hr)						
	Equipment	Amount	Class	VMT / hr	ROG	CO	NOx	SOx	PM10	PM2.5	CO2
Guzzlers	Small Bobcat	1	T6 - small	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.07
Branch Pond	Excavator	1	T6 - small	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.28
Branch Pond	Dump Truck	1	T6 - small	21.41	0.01	0.05	0.26	0.00	0.02	0.01	52.49
Piute Ponds	Scraper	1	T6 - small	6.00	0.00	0.01	0.07	0.00	0.01	0.00	14.71
Piute Ponds	Excavator	1	T6 - small	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.03
Piute Ponds	Excavator	1	T6 - small	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.14
Piute Ponds	Excavator - new ponds	1	T6 - small	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.09
Piute Ponds	Dump Truck	1	T6 - small	120.53	0.07	0.27	1.44	0.00	0.10	0.08	295.42
Piute Ponds	Front end Loader	1	T6 - small	6.00	0.00	0.01	0.07	0.00	0.01	0.00	14.71
Piute Ponds	Tractor	1	T6 - small	6.00	0.00	0.01	0.07	0.00	0.01	0.00	14.71
General Use & All Projects	Pick-up Truck	3	LHD1 - Gas	76.50	0.09	0.92	0.24	0.00	0.01	0.00	117.57
General Use & All Projects	Water Truck (storage tank)	1	T6 - small	31.25	0.02	0.07	0.37	0.00	0.03	0.02	76.60
ALL	Total	14		267.9	0.20	1.35	2.53	0.01	0.17	0.12	586.81

EFs include emissions from start, running and idling exhaust. In addition, the PM10 emission factors include tire and brake wear.

Emissions Due to Equipment and Vehicle Exhaust (Continued):

Location	Equipment Used				HRS /Day	Emissions (lb/day)						
	Equipment	Amount	Class	VMT / hr		ROG	CO	NOx	SOx	PM10	PM2.5	CO2
Guzzlers	Small Bobcat	1	T6 - small	0.03	2	0.00	0.00	0.00	0.00	0.00	0.00	0.14
Branch Pond	Excavator	1	T6 - small	0.12	8	0.00	0.00	0.01	0.00	0.00	0.00	2.26
Branch Pond	Dump Truck	1	T6 - small	21.41	8	0.10	0.38	2.04	0.00	0.15	0.11	419.89
Piute Ponds	Scraper	1	T6 - small	6.00	8	0.03	0.11	0.57	0.00	0.04	0.03	117.65
Piute Ponds	Excavator	1	T6 - small	0.01	8	0.00	0.00	0.00	0.00	0.00	0.00	0.23
Piute Ponds	Excavator	1	T6 - small	0.06	8	0.00	0.00	0.01	0.00	0.00	0.00	1.13
Piute Ponds	Excavator - new ponds	1	T6 - small	0.04	8	0.00	0.00	0.00	0.00	0.00	0.00	0.75
Piute Ponds	Dump Truck	1	T6 - small	120.53	8	0.54	2.16	11.49	0.02	0.83	0.61	2363.33
Piute Ponds	Front end Loader	1	T6 - small	6.00	8	0.03	0.11	0.57	0.00	0.04	0.03	117.65
Piute Ponds	Tractor	1	T6 - small	6.00	8	0.03	0.11	0.57	0.00	0.04	0.03	117.65
General Use & All Projects	Pick-up Truck	3	LHD1 - Gas	76.50	4	0.37	3.69	0.98	0.00	0.03	0.01	470.29
General Use & All Projects	Water Truck (storage tank)	1	T6 - small	31.25	8	0.14	0.56	2.98	0.01	0.21	0.16	612.76
ALL	Total	14		267.9	86	1.23	7.12	19.23	0.04	1.35	0.98	4223.73

EFs include emissions from start, running and idling exhaust. In addition, the PM10 emission factors include tire and brake wear.

Emissions Due to Equipment and Vehicle Exhaust (Concluded):

Location	Equipment Used					Emissions (ton/yr)						
	Equipment	Amount	Class	VMT / hr	HRS/ Year	ROG	CO	NOx	SOx	PM10	PM2.5	CO2
Guzzlers	Small Bobcat	1	T6 - small	0.03	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Branch Pond	Excavator	1	T6 - small	0.12	48	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Branch Pond	Dump Truck	1	T6 - small	21.41	48	0.0	0.0	0.0	0.0	0.0	0.0	1.3
Piute Ponds	Scraper	1	T6 - small	6.00	192	0.0	0.0	0.0	0.0	0.0	0.0	1.4
Piute Ponds	Excavator	1	T6 - small	0.01	192	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Piute Ponds	Excavator	1	T6 - small	0.06	192	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Piute Ponds	Excavator - new ponds	1	T6 - small	0.04	192	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Piute Ponds	Dump Truck	1	T6 - small	120.53	96	0.0	0.0	0.1	0.0	0.0	0.0	14.2
Piute Ponds	Front end Loader	1	T6 - small	6.00	192	0.0	0.0	0.0	0.0	0.0	0.0	1.4
Piute Ponds	Tractor	1	T6 - small	6.00	48	0.0	0.0	0.0	0.0	0.0	0.0	0.4
General Use & All Projects	Pick-up Truck	3	LHD1 - Gas	76.50	1460	0.1	0.7	0.2	0.0	0.0	0.0	85.8
General Use & All Projects	Water Truck (storage tank)	1	T6 - small	31.25	80	0.0	0.0	0.0	0.0	0.0	0.0	3.1
ALL	Total	14		267.9	2742	0.1	0.7	0.3	0.0	0.0	0.0	107.5

EFs include emissions from start, running and idling exhaust. In addition, the PM10 emission factors include tire and brake wear.

Ag Burn:

Assumptions:

Ag burn permitted hours 10am - 5pm, 10 acres or more need to submit a burn plan.

Assume ag burn has same emission factors as wood burning in a conventional fireplace ---AP 42 1.10-1

Assumed low lying brush to be burned is 3 inches tall

PM2.5 = 35% PM10 emission annual average Kern County, PM2.5 = 38% PM10 annual average Mojave Desert,

PM10 = 52% Total PM

Assume population of vegetation per acre is 30%

Ag Burn (Concluded):

			AG Burn						Emission Factors from Wood Combustion (lb/ton)						
Location	Hours per Day	Day /yr	Acreage Burned (over 5 years)	Max Acreage (acre / yr)	Burn Height (ft)	Max Volume (ft3 / yr)	Max Weight (tons/ yr)	Adjust Daily Weight (tons / day)	ROG	CO	NOx	SOx	PM 10	PM 2.5	CO2
Guzzlers	7	1	0	0	0	0	0	0.00	83	231	3	0	31	11	3849
Branch Pond	7	1	4	2	0.25	6534	20	20	83	231	3	0	31	11	3849
Piute Ponds	7	13	400	20	0.25	65340	196	15	83	231	3	0	31	11	3849
Total	21	15	404	22	1	71874	216	34.68	249	692	8	1	92	32	11547

37.5 lbs/ft3 = density average for wood----median of AP-42 Appendix A density for wood

			AG Burn						Emissions from Wood Combustion (ton/yr)						
Location	Hours per Day	Days /yr	Acreage Burned (over 5 years)	Max Acreage (acre / yr)	Height to be burned (ft)	Max Volume (ft3 / yr)	Max Weight (tons/ yr)	Adjust Daily Weight (tons / day)	ROG	CO	NOx	SOx	PM 10	PM 2.5	CO2
Guzzlers	7	1	0	0	0	0	0	0.00	0	0	0	0	0	0	0
Branch Pond	7	1	4	2	0.25	6534	20	20	1	2	0	0	0	0	38
Piute Ponds	7	13	400	20	0.25	65340	196	15	8	23	0	0	3	1	377
Total	21	15	404	22	1	71874	216	34.68	9	25	0	0	3	1	415

37.5 lbs/ft3 = density average for wood----median of AP-42 Appendix A density for wood

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APPENDIX D
COOPERATING AGENCIES AND PUBLIC REVIEW PROCESS

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AGENCY AND PUBLIC INVOLVEMENT

28 August 2014

Met with the California Department of Fish and Wildlife (CDFW) regarding agency inputs to management sections of the INRMP and how they would apply to the EA.

1 December 2014

Posted *INRMP EA* on Edwards AFB website with a request for any comments or concerns.

Sent electronic notification to the United States Fish and Wildlife Service (USFWS), and the California Department of Fish and Wildlife (CDFW) regarding the *Environmental Assessment (EA) for the Integrated Natural Resources Management Plan (INRMP)* for Edwards Air Force Base (AFB).

Sent notification of the INRMP EA availability, electronic location, and public comment period to the Air Force Test Center Base Library.

Published public notice in *Antelope Valley Press*.

2 December 2014

Sent notification of the INRMP EA availability, electronic location, and public comment period to the Air Force Test Center Technical Library and the NASA Library.

4 December 2014

Sent Memo, 15 copies of the Notice of Completion, and 15 disk copies of the INRMP EA to the State Clearing House (SCH Number 2014124002).

Sent a letter and one disk copy of the INRMP EA to each of the following Native American tribes:

- Chemehuevi Indian Tribe
- Colorado River Indian Tribes
- Morong Band of Mission Indians
- San Manuel Band of Mission Indians

5 December 2014

Published public notice in the *Desert Wings*.

12 December 2014

Published public notice in the *Mojave Desert News*.

RESPONSE TO PUBLIC COMMENTS

Lahontan Regional Water Quality Control Board- Comments from 31 Dec 14 letter:

1. Request a Mitigated Negative Declaration be prepared for the project that complies with and satisfies the requirements of both NEPA and CEQA.

Response- This Environmental Assessment (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 that implement NEPA (Sections 1500.1(b) et seq.) by evaluating the environmental impacts of the proposed project activities described within this EA. Based on the environmental analysis, it has been determined the project activities analyzed within this EA have no significant impact on the human environment; therefore, in accordance with NEPA and CEQ, a Finding of No Significant Impact (FONSI) has been prepared to complete the NEPA process. The California Environmental Quality Act (CEQA) and its associated Mitigated Negative Declaration are not applicable to Edwards Air Force Base.

2. The INRMP includes the potential for impacting drainages. Request measures be incorporated into the project to avoid surface waters and provide buffer zones where possible.

Response- Implementation of the INRMP per Description of the Alternatives section states that no impacts would occur to ephemeral washes (i.e., drainages).

3. If the proposed project impacts and alters drainages, request the project proponent obtain permit coverage and that the project be designed such that it would maintain existing hydrologic features and patterns to the extent feasible.

Response- Since no impacts would occur to washes or drainages, no permits would be required.

4. Construction Storm Water BMPs shall be implemented during active and post construction to manage storm water and minimize impacts from storm water runoff, such as erosion. The environmental document must specifically describe BMPs and their role in mitigation of project impacts.

Response- Proposed project activities do not involve major construction activities that would result in significant erosion problems. Habitat restoration would occur in areas where the elevation is relatively flat and would not occur in washes and drainages. Construction of bat roosts (bat houses) would be located in previously disturbed areas and would not be impacted from storm water run-off.

5. For those areas within the jurisdiction of the Lahontan Water Board, a number of activities associated with future mitigation may have the potential to impact waters of the State and, therefore, may require permits issued by the Water Board.

Response- The Lahontan Water Board does not have jurisdiction over the waters on Edwards Air Force Base; therefore permits from the Lahontan Water Board are not required.