



Department
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Command

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Draft Environmental Assessment Implementation of the Integrated Cultural Resources Management Plan Fort Irwin, CA

Notice: Reviewers should provide the Department of the Army (DA) with their comments during the review period of the Environmental Assessment (EA). This will enable the DA to analyze and respond to the comments at one time and to use information acquired in the preparation of the EA, thus avoiding undue delay in the decision-making process. Reviewers have an obligation to structure their participation in the National Environmental Policy Act process so that it is meaningful and alerts the agency to the reviewers' position and contentions (Vermont Yankee Nuclear Power Corp. v. NRDC, 435 U.S. 519, 553, 1978). Environmental objections that could have been raised at the draft stage may be waived if not raised until after completion of the Final Environmental Impact Statement (City of Angoon v. Hodel, 9th Cir, 1986; and Wisconsin Heritages Inc., v. Harris, 490F. Supp. 1334, 1338, E.D. Wis. 1980) Comments on the EA should be specific and should address the adequacy of the statement and the merits of the alternatives discussed (40 *Code of Federal Regulations* [CFR] 1503.3).

Comments received in response to this document, including names and addresses of those who comment, will be considered part of the public record on this Proposed Action and will be available for public inspection. Comments submitted anonymously will be accepted and considered; however, those who submit anonymous comments will not have standing to appeal the subsequent decision under 36 CFR Parts 215 or 217. Additionally, pursuant to 7 CFR 1.27(d), any person may request the agency to withhold a submission from the public record by showing how the Freedom of Information Act (FOIA) permits such confidentiality. Persons requesting such confidentiality should be aware that, under FOIA, confidentiality may be granted in only very limited circumstances, such as to protect trade secrets. The DA will inform the requester of the agency's decision regarding the request for confidentiality, and where the request is denied the agency will return the submission and notify the requester that the comments may be resubmitted, with or without name and address.

Additional documentation, reports, and analysis referenced in this document can be found in the administrative record files. These items have not been included in this document due to technical nature, excessive length, or are reference materials used to develop the analysis in this document. All supporting documents in the planning record are located at the Environmental Management Division, Department of Public Works, Fort Irwin, California.

SIGNATURE PAGE

ENVIRONMENTAL ASSESSMENT

Implementation of the Integrated Cultural Resources Management Plan

Proponent: U.S. Army Garrison, Fort Irwin, California

NEPA Lead Agency: U.S. Army Garrison, Fort Irwin, California

APPROVAL

This Environmental Assessment meets the requirements of NEPA, 40 CFR 1500-1508, Army Regulation 200-1, Environmental Protection and Enhancement, dated 13 December 2007 and 32 CFR 651(AR 200-2) Environmental Analysis of Army Actions, dated 29 March 2002.

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EXECUTIVE SUMMARY

This Environmental Assessment (EA) was prepared to analyze the potential environmental effects associated with the implementation of the 2016-2020 Integrated Cultural Resources Management Plan (ICRMP) for Fort Irwin and the National Training Center (NTC).

The Fort Irwin installation encompasses approximately 753,537 acres of land and is located in San Bernardino County, California, approximately 35 miles northeast of the City of Barstow, California, and within the north-central part of the Mojave Desert.

The Proposed Action analyzed in this EA is the implementation of the 2016-2020 ICRMP. The primary objective of the ICRMP is to integrate federal requirements for cultural resources with the planning and execution of Fort Irwin's mission objectives. Preparation and implementation of the ICRMP is required by Department of Defense Instruction 4715.16, Cultural Resource Management (DoD, 1996), and Army Regulation 200-1, Environmental Enhancement and Protection (Army, 2007).

Two alternatives are analyzed in this EA, the Proposed Action and the No Action Alternative. Because implementation of the ICRMP is a regulatory requirement, Fort Irwin did not consider additional alternatives.

The Proposed Action would involve the full implementation of the ICRMP, as required by law. Under the No Action Alternative, the Army would not implement the ICRMP, and management activities currently being conducted under previous versions of this plan would continue. The No Action Alternative is required under the Council of Environmental Quality regulations implementing the National Environmental Policy Act, and serves as a baseline or benchmark to be compared with the Proposed Action and alternatives.

No significant impacts are anticipated to result from implementing the Proposed Action. Some minor impacts to certain resource areas would be expected, but these impacts would be less than significant. Implementation of the Proposed Action would also have minor, beneficial impacts to the local economy and would have long-term, beneficial impacts to water, soil and cultural and paleontological resources.

Table ES-1: Summary of Potential Effects and Minimization Measures

Resource Area	Level of Anticipated Effect			Summary of Potential Effects and Minimization Measures
	Significant	Less than Significant	No Impact	
Land Use Planning and Aesthetics			√	No significant effects to land use planning and aesthetics are anticipated as a result of the implementation of the Proposed Action. Projects proposed in the ICRMP and associated cultural resources management activities would not result in any inconsistencies with applicable land use laws or designations, loss of access to public and private lands, or degradation of the

Resource Area	Level of Anticipated Effect			Summary of Potential Effects and Minimization Measures
				<p>aesthetic character.</p> <p>No mitigation measures are required for land use or aesthetics.</p>
Geology, Soils, and Mineral Resources		√		<p>No effects to geology or minerals are expected. No significant effects to soils are anticipated. Minor short-term effects to soils would result from cultural resources management activities that involve ground disturbance.</p> <p>Site specific BMPs such as the preparation of a SWPPP, would be implemented to minimize soil disturbance and erosion. Soil resources are protected in areas that are off limits and individual cultural resources management activities would be reviewed under the INRMP to avoid effects to soil resources.</p>
Biological Resources		√		<p>No significant effects to biological resources are anticipated as a result of the implementation of the Proposed Action. Minor short-term effects to biological resources may result from cultural resources management activities that involve ground disturbance.</p> <p>However, under the INRMP, cultural resources management activities would be reviewed to evaluate potential biological effects prior to the start of individual projects, site specific BMPs would be implemented to minimize potential biological resource disturbance, and biological resources are protected in areas that are off limits.</p>
Water Resources		√		<p>No significant effects to water resources are expected as a result of the implementation of the Proposed Action. Projects proposed in the ICRMP and associated cultural resources management activities would be evaluated for potential effects. No effects to groundwater or water quality are expected.</p> <p>Site-specific plans would be developed and a SWPPP will be obtained, if necessary, to minimize the potential for nonpoint source pollutants affecting water resources. Water resources are protected in the areas where springs and playas are off limits to all training. Fort Irwin educates field personnel about the off limits nature of spring locations as part of major briefings prior to each military exercise in order to avoid impacts by military equipment and personnel. Fort Irwin erects fencing and metal crossbars at springs likely to be approached by wheeled and tracked vehicles in an effort to reduce accidental intrusion into</p>

Resource Area	Level of Anticipated Effect			Summary of Potential Effects and Minimization Measures
				and subsequent damage to these resources.
Air Quality		√		<p>No significant effects to air quality are expected. Potential effects would be expected during certain cultural resources management activities. Most activities' emissions would be fugitive dust and vehicle and equipment exhaust. Overall, effects would be less than significant and would not contribute significant emissions to local or regional air quality.</p> <p>Standard management practices and site specific BMPs would be implemented to minimize potential fugitive dust.</p>
Noise		√		<p>No significant effects would result from the noise generated by the Proposed Action. Noise associated with project vehicles and equipment would be consistent with noise already occurring at Fort Irwin.</p> <p>No mitigation measures are required for noise effects.</p>
Cultural Resources		√		<p>No significant effects to cultural resources are anticipated as a result of the implementation of the Proposed Action. Minor, indirect, and long-term positive effects to cultural resources are expected as a result of the implementation of the ICRMP. The objective of the ICRMP is to protect and preserve the cultural resources at Fort Irwin.</p> <p>The SOPs outlined in the ICRMP are based on applicable federal, state, and local environmental laws and regulations, Army regulations, and formal agreements that are designed to help avoid adverse impacts to meet Fort Irwin's cultural resources management goals. In addition to specific SOPs, the ICRMP also provides SOPs for routine activities that may have an effect on cultural resources. These SOPs are essentially BMPs such as fencing and restrictions, SHPO consultation, education and outreach, and developing Treatment Plans for the protection of cultural resources.</p>
Paleontological Resources		√		<p>No significant effects to paleontological resources are anticipated as a result of the implementation of the Proposed Action. Minor, indirect, and long-term positive effects to paleontological resources are expected as a result of the implementation of the ICRMP. Paleontological resources fall under the same protection</p>

Resource Area	Level of Anticipated Effect			Summary of Potential Effects and Minimization Measures
				<p>considerations as outlined in the ICRMP SOPs.</p> <p>Various applicable federal, state, and local environmental laws and regulations, Army regulations and formal agreements are designed to help avoid adverse effects to paleontological resources. The Army vigorously pursues the protection of paleontological resources from theft, destruction and other illegal or unauthorized uses. The same BMPs applied to cultural resources apply to paleontological resources as well as conducting paleontological inventories and briefings through education and outreach for the protection of paleontological resources.</p>
<p>Socioeconomics and Environmental Justice</p>		√		<p>No significant effects to socioeconomics are anticipated as a result of the implementation of the Proposed Action. Short-term, minor, beneficial effects to the local economy may result from increased sales volumes during the duration of some proposed activities. No effects would result in environmental injustice or human health and safety issues.</p> <p>No mitigation measures are required for socioeconomic and environmental justice issues.</p>
<p>Infrastructure</p>			√	<p>No significant effects to infrastructure are anticipated as a result of the implementation of the Proposed Action.</p> <p>No mitigation measures are required for infrastructure.</p>

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ACRONYMS

<	Less than
>	Greater than
amsl	above mean seal level
ACEC	Area of Environmental Critical Concern
ADNL	A-weighted Day-Night Level
AR	Army Regulation
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
°C	Degrees Celsius
CA	California
CAA	Federal Clean Air Act
CAAQS	California Ambient Air Quality Standards
CARB	California Air Resource Board
CCAA	California Clean Air Act
CDNL	C-Weighted Day-Night Level
CESA	California Endangered Species Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CGS	California Geological Survey
CO	Carbon Monoxide
dB	Decibel
dB(A)	Decibel on an A-weighted scale
dB(C)	Decibel on a C-weighted scale
DNL	Day-Night Level
DoD	Department of Defense
DoDI	Department of Defense Instruction
DPW	Directorate of Public Works
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
°F	Degrees Fahrenheit
FNSI	Finding of No Significant Impact
GDSCC	Goldstone Deep Space Communications Complex
ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan
Ldn	Day-Night Level
Leq	Equivalent Energy Level
LUPZ	Land Use Planning Zone
MBTA	Migratory Bird Treaty Act
MDAB	Mojave Desert Air Basin
MDAQM	Mojave Desert Air Quality Management District

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mg/m ³	Milligram Per Cubic Meter
NA	Not applicable
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NAWS	Naval Air Weapons Station
NEPA	National Environmental Policy Act
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
NTC	National Training Center
NV	Nevada
O ₃	Ozone
ONAC	Office of Noise Abatement and Control
Pb	Lead
PK 15(met)	Single Event Peak Level Exceeded by 15 Percent of Events
PM	Particulate matter
PM _{2.5}	Particulate Matter with a Diameter 2.5 Micrometers or Less
PM ₁₀	Particulate Matter with a Diameter 10 Micrometers or less
P.O. Box	Post Office Box
ppb	Parts Per Billion
ppm	Parts Per Million
SEL	Sound Exposure Level
SIP	State Implementation Plan
SO ₂	Sulfur Dioxide
SOP	Standard Operating Procedure
SHPO	State Historic Preservation Office
µg/m ³	Microgram Per Cubic Meter
U.S.	United States
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UTM	Universal Transverse Mercator
VOC	Volatile Organic Compounds
WRCC	Western Regional Climate Center
WSA	Wilderness Study Area
ybp	years before present

CHAPTER 1 - PURPOSE AND NEED

1.1 Introduction

Fort Irwin is located in San Bernardino County, California, approximately 35 miles northeast of Barstow, California, and within the north-central part of the Mojave Desert. The Fort Irwin installation encompasses approximately 753,537 acres. Fort Irwin hosts the headquarters for the U.S. Army Garrison, Fort Irwin and the National Training Center (NTC). It is home to the 11th Armored Cavalry Regiment, the 916th Support Brigade, the National Aeronautics and Space Administration Goldstone Deep Space Communications Complex (GDSCC), and numerous other tenant units and organizations. Fort Irwin and the NTC serve as the United States Army's premier field combat training facility. Over 60 percent of Fort Irwin's land area is used for desert battlefield training, while a 3-square-mile area is designated as the cantonment. This cantonment area hosts the command and control elements of Fort Irwin and the NTC and provides temporary and permanent living quarters for soldiers and their families with residential areas, support facilities, retail centers, restaurants, and health care facilities.

Department of Defense (DoD) Instruction (DoDI) 4715.16, Cultural Resource Management, and Army Regulation (AR) 200-1, Environmental Protection and Enhancement, specify Army policy for cultural resources management. The Installation Management Command (IMCOM) directs and assists its installations in the conduct of installation cultural resources programs consistent with AR 200-1. The Garrison Commander has direct responsibility for establishing an installation cultural resources management program by means of an Integrated Cultural Resources Management Plan that successfully integrates cultural resources management within the process of achieving daily mission objectives.

This Environmental Assessment (EA) will assess the environmental impacts for the implementation of the updated (2016-2020) Fort Irwin ICRMP. The ICRMP is a five-year plan for the integrated management of the historic and archaeological resources contained within the limits of Fort Irwin. The ICRMP contains a series of goals, objectives and standard operating procedures (SOPs) that will enable Fort Irwin to meet its legal responsibilities for the management of cultural resources.

Fort Irwin's current ICRMP covers 2011-2015 and will be completed in 2016 to include paleontological resources management. The 2016-2020 ICRMP will provide guidance and procedures in order to identify, evaluate, and protect cultural and paleontological resources while achieving Fort Irwin's daily mission objectives.

1.2 Purpose and Need for the Proposed Action

The purpose of the Proposed Action is to fully implement the cultural resources program as developed in the ICRMP, which ensures management of cultural resources meets federal preservation requirements while accomplishing operational mission objectives.

All federal agencies, including Fort Irwin, are required by law to take necessary measures to identify, significant cultural resources under their jurisdiction and to consider the effects that their actions may have on these assets. Cultural resources are defined as cultural landscapes, ethnographic resources, historic places, properties of traditional and cultural importance, artifacts and documents, buildings, structures, sites, districts, and objects. Army Regulation (AR) 200-1 and DOD Instruction 4715.16 require the development of an ICRMP that incorporates consideration of cultural resources while achieving

mission objectives. The ICRMP is a base-wide cultural resources management plan and serves as a component of Fort Irwin's Master Plan and complements other facility plans such as the Integrated Natural Resources Management Plan (INRMP) and the Range Complex Master Plan. The ICRMP is updated annually and revised every five years as needed.

1.2.1 Project Need

The Proposed Action is needed to ensure that Fort Irwin remains in compliance with DOD cultural resources policy and the legal requirements concerning cultural resources. Implementation of the Proposed Action will allow Fort Irwin to efficiently and effectively utilize the ICRMP as the comprehensive decision document for cultural resources management detailing specific cultural resources compliance procedures.

1.2.2 Project Objective

The primary objective of the Proposed Action is to provide a proactive cultural resources management tool that allows Fort Irwin to achieve cultural resource management goals, mission objectives, and compliance with cultural resources regulations and policies.

1.3 Scope of Analysis

This EA was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 and implementing regulations specified in 40 Code of Federal Regulations (CFR) Part 1500 through Part 1508, and 32 CFR Part 651. This EA identifies, documents, and evaluates potential environmental and socioeconomic effects of the Proposed Action and seeks to ensure that appropriate consideration has been given to environmental resources. It includes a thorough evaluation of direct, indirect, and cumulative impacts, both temporary and permanent, that could occur as a result of implementing the Proposed Action. Reasonably foreseeable future actions are identified in Section 4. Any additional requirements stemming from other unrelated military actions would undergo separate NEPA analysis and evaluation.

This EA also considers the potential impacts of the No Action Alternative, as required by NEPA. The No Action Alternative provides a benchmark against which the potential impacts of the Proposed Action and the alternatives can be compared.

An interdisciplinary team of environmental scientists, biologists, planners, economists, engineers, archaeologists, historians, and military technicians has analyzed the Proposed Action and alternatives in light of existing conditions and has identified relevant beneficial and adverse effects associated with the action and alternatives.

Resources evaluated in this EA include land use planning and aesthetics, geology, soils and mineral resources, biological resources, water resources, air quality, noise, cultural and paleontological resources, socioeconomics/environmental justice, and infrastructure.

Hazardous and toxic substances has been eliminated from further consideration in this EA because no cultural resource management activities would require the use of hazardous and toxic materials and/or the generation of hazardous or solid waste. Existing federal and state laws, Army regulations, and handling practices would continue at the installation regardless of cultural resource management activities.

1.4 Framework for Decision Making

The U.S. Army is the lead agency for this NEPA analysis of the Proposed Action. This EA will be used to identify any potentially significant impacts of the Proposed Action, identify environmental concerns in advance of project implementation, and discuss any appropriate mitigation measures for those concerns. It may also be used to support obtaining permits and approvals from other agencies, including the U.S. Fish and Wildlife Service (USFWS) and the Mojave Desert Air Quality Management District (MDAQMD). Agencies could use this EA to support their decision to issue approvals and/or permits for the Proposed Action. Agency discussions and coordination would be needed to determine the specifics of any future permit or approval that may be required.

1.5 Agency and Public Participation

The U.S. Army invites public participation in the proposed federal action. Considering the views and information of all interested persons promotes open communication and enables better decision-making. All agencies, organizations, and members of the public having a potential interest in the Proposed Action, including minority, low-income, disadvantaged, and Native American groups, are urged to participate in the decision-making process.

Public participation opportunities with respect to this EA and decision-making on the Proposed Action are guided by 32 CFR Part 651. The Final Draft EA and Draft Finding of No Significant Impact (FNSI) will be made available to the public for comment for a period of 30 days. At the end of the 30-day public review, the U.S. Army will consider all comments submitted by individuals, agencies, and organizations. As appropriate, the U.S. Army may then execute the FNSI and proceed with implementation of the Proposed Action. If implementing the Proposed Action was determined to result in significant effects, then the U.S. Army would publish a Notice of Intent in the Federal Register to prepare an Environmental Impact Statement (EIS) or would not take the action.

Throughout this process, the public may obtain information on the status and progress of the Proposed Action and the EA through Mr. Clarence Everly, Fort Irwin Directorate of Public Works, Environmental Division, Building 602, P.O. Box 105085, Fort Irwin, CA 92310-5085 or via email to clarence.a.everly.civ@mail.mil.

1.6 Relevant Statutes, Regulations, and Executive Orders

NEPA serves to meet environmental review requirements such as actions that have an impact on endangered species, historic properties, or low income communities. Under the Council on Environmental Quality (CEQ) NEPA Regulations, 40 CFR 1502.25 other environmental review requirements are met when analyzing potential impacts of the proposed action, such as the Endangered Species Act, the National Historic Preservation Act, the Environmental Justice Executive Order, and other Federal, State, Tribal, and local laws and regulations.

The relevant statutes, regulations and executive orders are outlined under the Regulatory Requirements section of each resource in Chapter 3 Affected Environment and Environmental Consequences.

1.7 Permits, Approvals, and Agreements Required by Other Agencies

The Directorate of Public Works (DPW) at Fort Irwin is charged with managing environmental programs on a day-to-day basis. AR 200-1 requires that the impact of major actions on cultural and natural resources be assessed prior to the commencement of those activities.

The implementation of the EA/ICRMP will not require any permits, however any applicable permits required for individual projects within the guidance of the ICRMP would be obtained prior to the start of the project and complied with throughout the duration of the project.

CHAPTER 2 - Description of Proposed Action and Alternatives

2.1 Proposed Action

The Proposed Action is the implementation of the ICRMP, which is a five-year planning document used to implement Fort Irwin's cultural resources management program. The ICRMP assists in cultural resources management activities decision making by advancing compliance procedures that satisfy cultural resource laws, regulations, and policies. The ICRMP is an internal Army compliance and management plan that integrates the entirety of the installation's cultural resources program with ongoing mission activities. The plan identifies potential conflicts between the installation's mission and cultural resources and identifies appropriate compliance actions required to maintain the availability of mission-essential properties and acreage.

Fort Irwin's current ICRMP covers 2011-2015 and will be updated in 2016 to include paleontological resource management. The 2016-2020 ICRMP will provide guidance and procedures in order to identify, evaluate, and manage cultural resources while executing Fort Irwin's operational mission. The ICRMP provides standards, objectives, policies, and procedures for the management of cultural resources while supporting the ongoing mission activities at the installation. Installation goals for the next five years are outlined in the ICRMP, as well as detailed guidelines for inventory and evaluation of installation property. The ICRMP includes a series of SOPs that have been developed to ensure installation compliance with all applicable laws and regulations. The topics for SOPs include: assessment and mitigation of effects that could potentially affect eligible, or potentially eligible to the National Register of Historic Places (NRHP) sites or structures; procedures for inadvertent discovery of cultural materials; Archaeological Resources Protection Act (1979) compliance; Native American Graves Protection and Repatriation Act (1990) compliance; tribal consultation; identification and evaluation procedures for historic properties; NEPA (1969) compliance; external coordination with the State Historic Preservation Office (SHPO); and curation of cultural materials. The ICRMP essentially outlines procedures for the management of significant cultural resources, including site nondisclosure information (relating to the sensitive nature of site locations), avoidance, physical protection, and data recovery. Each year the adequacy of the ICRMP is reviewed and updated to improve its effectiveness.

The primary objective of the ICRMP is to integrate federal requirements for cultural resources with the planning and execution of the installation's mission objectives. All actions are coordinated through the Installation Cultural Resources Program. Prior to initiation of any project, the Environmental Management Division reviews the proposed activity for environmental compliance. The Cultural Resource Manager reviews activity that involves construction, ground disturbance, or renovation for potential effects to installation cultural resources. Projects that are determined to have a potential effect to cultural resources, including potentially significant historic structures and archaeological sites, are coordinated through the California SHPO and federally affiliated Native American tribes.

2.2 No Action Alternative

Under the No Action Alternative, the 2016-2020 ICRMP would not be implemented. Cultural resources management on the installation would continue under the current 2011-2015 ICRMP procedures. The No Action Alternative would not provide an up-to-date management plan integrating on-going mission activities with federal cultural resources laws and regulations, including the management of paleontological resources. Under the No Action Alternative, the plans for compliance with cultural

resource laws and regulations would be conducted on an individual basis. The No Action Alternative is not feasible as it does not ensure compliance with federal regulations. If the updated ICRMP is not implemented, the installation would not be in compliance with AR 200-1, which directs each installation to prepare and implement an ICRMP.

2.3 Alternatives Considered but Not Carried Forward

In considering the feasibility of other alternatives, the following screening criteria were applied.

- The alternative must be applicable and consistent with established federal, state laws, and Army regulations.
- The alternative must include the management of paleontological resources.

In order to comply with AR 200-1, an ICRMP must be prepared and implemented. The directives of AR 200-1 encompass compliance with all other established cultural resources regulations. Fort Irwin's current ICRMP covers 2011-2015 and will be updated in 2016 to include paleontological resources. There are no alternatives for partially implementing the ICRMP or for preparing a cultural resource management plan that does not follow AR 200-1 ICRMP standards. Therefore, no other alternatives are feasible or carried forward

CHAPTER 3 - AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Introduction

This chapter describes the affected environment and environmental consequences of implementation of the Proposed Action and No Action Alternative at Fort Irwin and the National Training Center (Fort Irwin). Implementation of the Proposed Action involves implementation of the 2016-2020 ICRMP and conversely the ICRMP would not be implemented under the No Action Alternative (see Chapter 2.0).

The affected environment describes the existing environmental conditions potentially affected by the Proposed Action and No Action Alternative. In compliance with NEPA, CEQ guidelines, and 32 CFR Part 651, et seq., the description of the affected environment focuses on those resources and conditions potentially subject to impacts.

The environmental consequences describe the potential environmental effects associated with the Proposed Action and the No Action Alternative. This section of the document assesses known, potential, and reasonably foreseeable environmental consequences related to the development and implementation of the ICRMP and managing cultural/paleontological resources at Fort Irwin. An environmental impact or consequence is defined as a modification or change in the existing environment brought about by the action taken. Effects can vary by magnitude (negligible, minor, moderate, and major) and duration (temporary, short-term, or long-term). A significant or major impact is measured by the severity of the effect and must be examined in terms of type, quality and sensitivity of the resource involved. The environmental consequences section for each resource outlines effects that would be considered significant.

This chapter is organized into environmental resource sections that include discussions of the region of influence (ROI), regulatory requirements, and environmental consequences discussed under each resource. This chapter closes with a discussion of Best Management Practices (BMP). The BMPs are standard environmental protection measures that Fort Irwin routinely implements to avoid effects to environmental resources.

The ROI is the geographic extent of a particular resource that is being evaluated and is determined by including the area potentially affected by the Proposed Action. Both the nature of the resource and components of the Proposed Action dictate this variation.

The basic regulatory requirements associated with preparation of this EA are: the CEQ regulations for implementing NEPA, which are found in 40 CFR 1500-1508; DoDI 4715.9 on Environmental Planning and Analysis (DoD, 1996); 32 CFR 651 Environmental Analysis of Army Actions; and AR 200-1 Environmental Protection and Enhancement (Army, 2007). Other individual environmental resource regulatory requirements relevant to the Proposed Action are listed under each resource section. Fort Irwin shall comply with applicable federal, state, and local guidelines and regulations; and shall obtain applicable federal and state permits before initiating any activities under the Proposed Action.

3.2 Land Use Planning and Aesthetics

This section describes the affected environment and environmental consequences for land uses and aesthetic resources within the ROI. The three primary aspects of the aesthetic concept include relation to human senses, arts, and beauty. Aesthetic factors include nature; cultural, social, and economic expression; and lifestyle.

3.2.1 Affected Environment

The ROI for land use resources that could potentially be affected by the Proposed Action includes the 753,537 acres of land at Fort Irwin and the land immediately adjacent.

Regulatory Requirements

The Federal Land Policy and Management Act (FLPMA) of 1976 (43 USC 1701 et seq.) establishes congressional policy relating to the use and management of public lands. Additionally, AR 200-1 and Executive Order (EO) 13327, Federal Real Property Asset Management, apply to Army Organizations and Federal Property, respectively, regarding land use, resource management, asset management and policies relative to the environment and planning. AR 200-1 states that, "Installation strategic planning incorporates the concepts and philosophy of sustainability, the ultimate objective in strategic planning, and must be applied to and supported by all functional areas within the command."

Location

Fort Irwin is located in the heart of the Mojave Desert, approximately 37 miles northeast of the City of Barstow, California, in San Bernardino County, approximately 100 miles southwest of Las Vegas, Nevada, and approximately two miles south of Death Valley National Park (Figure 3.2-1). The San Bernardino and San Gabriel Mountains are oriented east to west approximately 60 miles southwest of Bicycle Lake Army Air Field. The Sierra Nevada Mountains, approximately 70 miles to the west of Fort Irwin are oriented north to south. Elevations at Fort Irwin range from 1,300 to 6,000 feet.

Adjacent Land Use

Bureau of Land Management (BLM) lands surround Fort Irwin to the north, south, and east. Naval Air Weapons Station (NAWS) China Lake is located directly to the west. Lands at China Lake adjoining Fort Irwin are used for air-to-ground gunnery and a variety of research, development, testing, and evaluation of Navy air weapons. With the exception of the aerial gunnery range on the southern edge of China Lake, most of the area has few ground-disturbing impacts, and there is a requirement for a highly controlled emission environment (both dust and electronic) at NAWS China Lake to support research requirements (Army, 2006).

The land directly north of Fort Irwin consists of a narrow BLM corridor that is a Wilderness Study Area (WSA), further beyond is Death Valley National Park. Land northeast of Fort Irwin includes the Avawatz Mountains WSA and the Kingston Range WSA. Land adjacent to the east and south consists of multiple-use BLM land interspersed with state school land and private land. To the south and southeast, Fort Irwin borders a large power transmission line utility corridor and beyond that is the Soda Mountains WSA.

Figure 3.2-2 depicts Fort Irwin and the surrounding area and Figure 3.2-3 shows the Fort Irwin training corridors.

Most of the surrounding BLM lands are designated Limited Use with two small northeastern-adjacent parcels designed as moderate use (controlled balance between higher intensity use and protection). There are several BLM Areas of Critical Environmental Concern (ACEC) in the vicinity of Fort Irwin. The two closest to Fort Irwin are Denning Spring ACEC located north of Fort Irwin and east of Leach Lake Gunnery Range, and Black Mountain ACEC located west of Fort Irwin and south of NAWS China Lake.

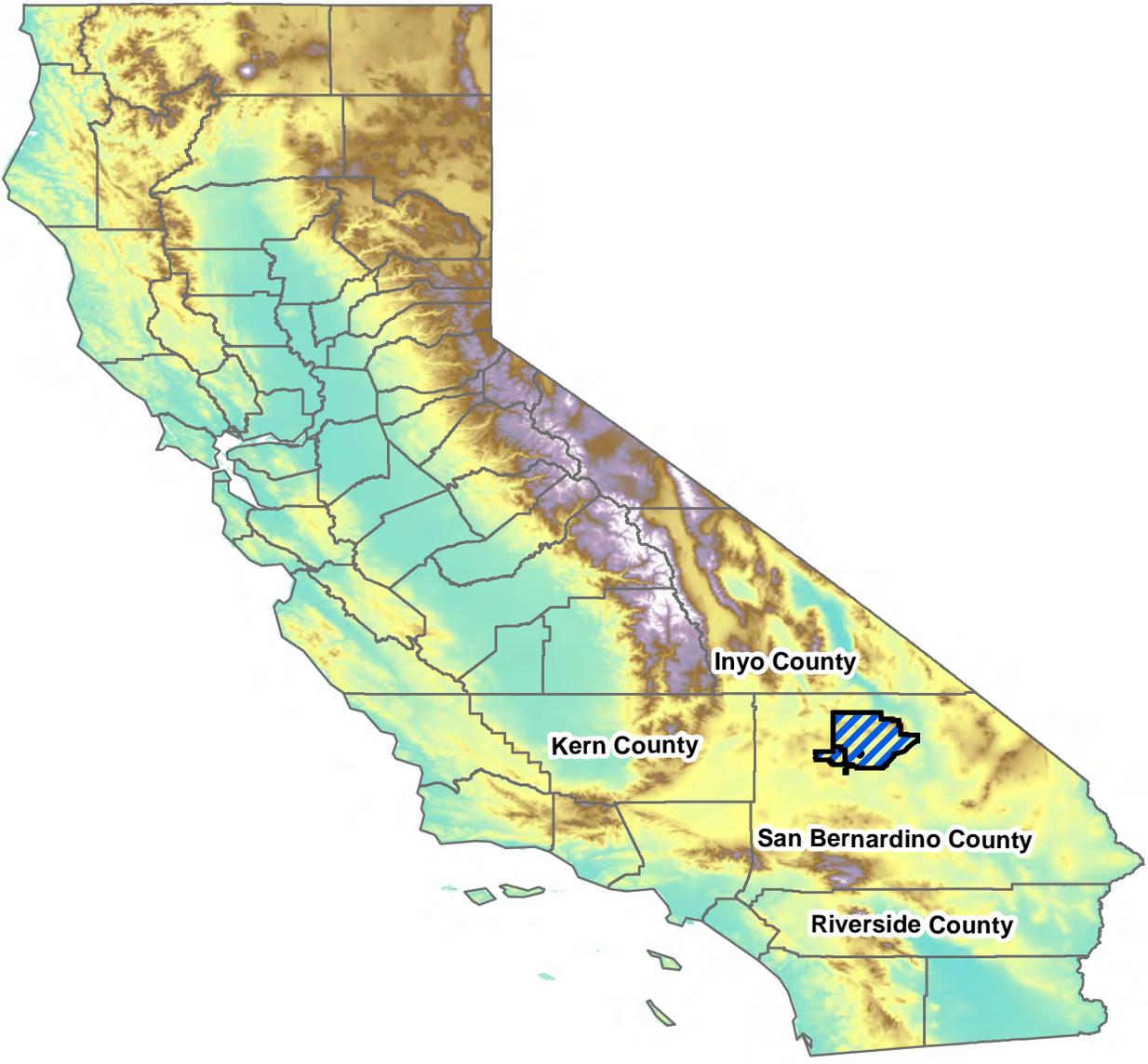
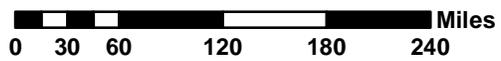


Figure 3.2-1
General Location
Fort Irwin EA/ICRMP

SCALE: 1 in = 110 miles DATE DRAWN: MAY 25, 2016



Legend



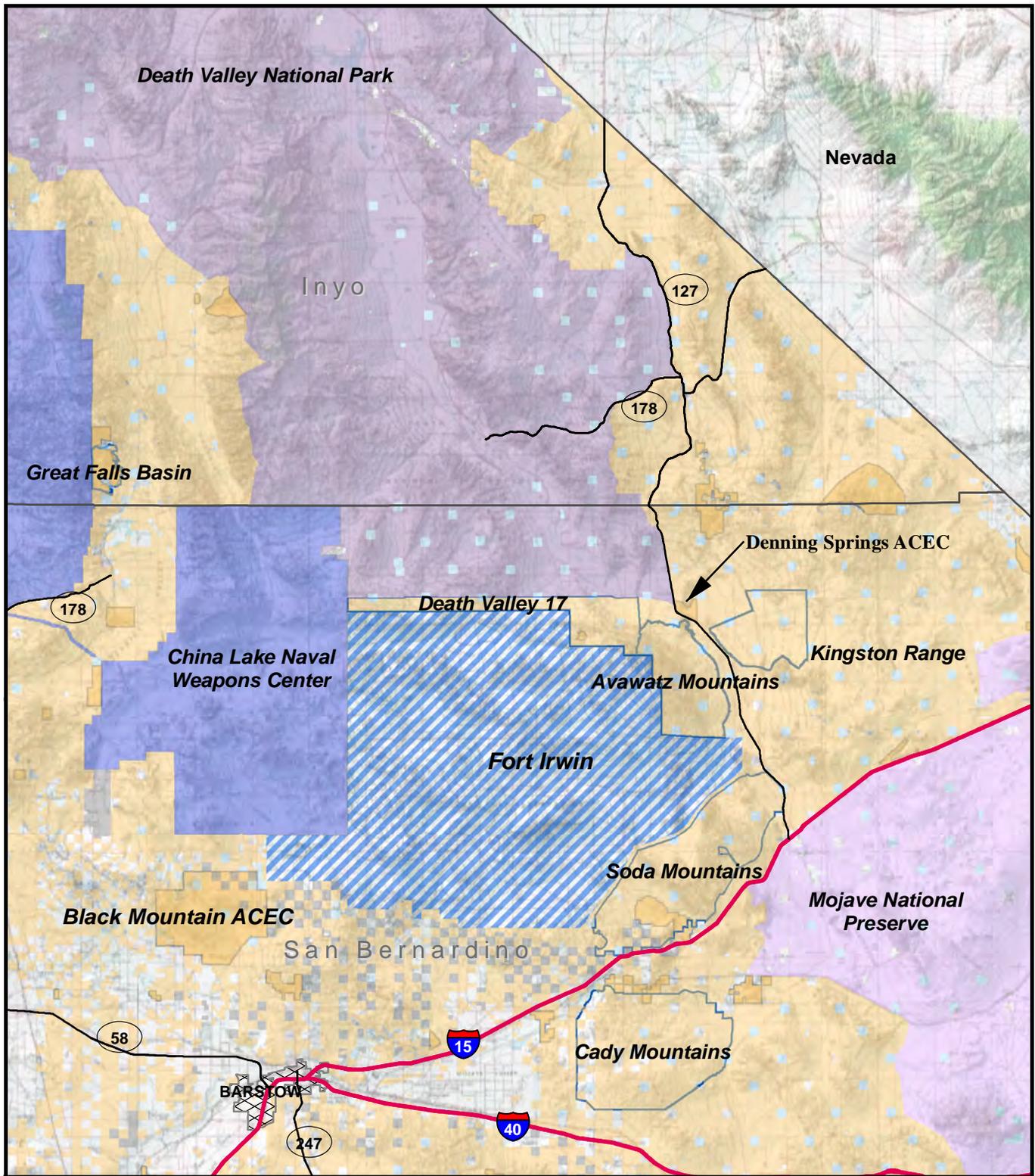


Figure 3.2-2
Land Use
Fort Irwin EA/ICRMP

SCALE: 1 in = 16 miles DATE DRAWN: MAY 24, 2016



Legend

	State Lands
	Private Lands
	Bureau of Land Management
	Department of Defense
	Death Valley National Park
	China Lake Naval Center
	Mojave National Preserve
	BLM Wilderness Study Area
	BLM ACEC

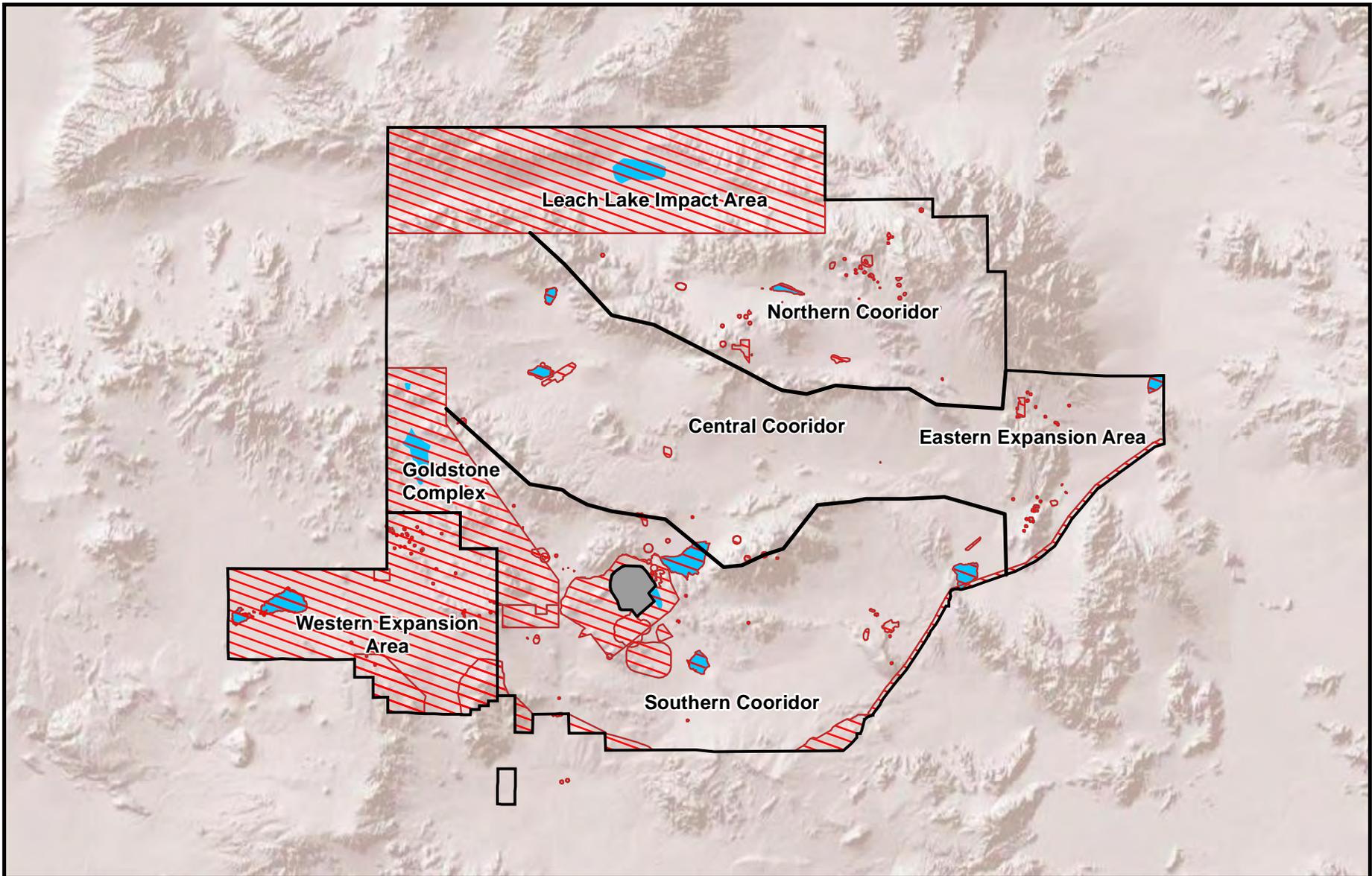
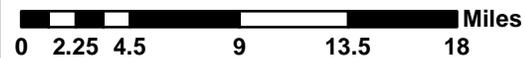


Figure 3.2-3
Training Corridors and Off Limit Areas
Fort Irwin EA/ICRMP

SCALE: 1 in = 8 miles DATE DRAWN: MAY 25, 2016



Legend

-  Installation Boundary
-  Off Limit Area
-  Cantonment
-  Dry Lakes and Playas

Fort Irwin Land Use

Fort Irwin is one of three military installations within the R-2508 Special Use Air Space Complex covering a land area of 12,800,000 acres. The R-2508 Complex covers the largest single block of restricted airspace in the nation and provides weapons research and development, and an arena for realistic military training (ORP, 2008). Fort Irwin's primary land uses include:

- Maneuver and live fire training areas,
- Cantonment Area,
- National Aeronautics and Space Administration (NASA) Goldstone Deep Space Communications Complex (GDSCC), and
- Conservation Areas,

Areas Fort Irwin is unable to use for training include the Cantonment Area (14,309 acres), the majority of the GDSCC (33,229 acres), and an additional 17,222 acres due to the presence of unexploded ordnance and environmentally protected areas (natural and cultural resource areas).

Maneuver and Live Fire Training Areas

The Maneuver and Live Fire Training Area is divided into three training corridors, the northern, central, and southern corridors which trend east-west and are subdivided into 68 training areas (Figure 3.2-4). Currently, the National Training Center conducts 10 brigade sized training rotations each year. The live-fire portion of each rotation is conducted primarily in the northern corridor. The majority of force-on-force maneuvers take place in the central and southern corridors.

The Leach Lake Gunnery Range covers most of the northern portion of Fort Irwin and the Leach Lake Basin. Since 1967, this Range has been used by the U.S. Air Force, the U.S. Navy, and the U.S. Marine Corps year-round for air-to-air and air-to-ground gunnery, and as an east-west, low-level flight corridor. Virtually all types of U.S. military aircraft (fighters and bombers) use Leach Lake (Army, 2006). The Army uses the Leach Lake Gunnery Range as an impact area for artillery and mortar live fire training.

Cantonment Area

The cantonment area is located in the southwestern portion of Fort Irwin. Day-to-day operations, administrative activities, family housing and neighborhood parks, barracks, maintenance yards, indoor recreation, and restaurant facilities are located in this area. Recreation and other facilities within the cantonment area operate independently of military activities on the installation except that the level of facility use fluctuates depending on the rotational schedule of Fort Irwin soldiers.

The cantonment area is nearly completely developed. The extent and quality of the landscaping varies, especially among the housing facilities where residents maintain their own yards. Some facilities are landscaped and are regularly maintained, while others either are not landscaped or need maintenance (Army, 2006).

The Cantonment Area can be subdivided into six subareas, as follows: (1) residential areas used for family housing; (2) professional/institutional areas used for training support and planning; (3) community zones used for businesses, medical, retail, and public services; (4) industrial zones used for maintenance, logistics, and transportation activities; (5) range/community spaces used for training, recreation, and future development; and (6) areas used for housing soldiers (Army, 2011).

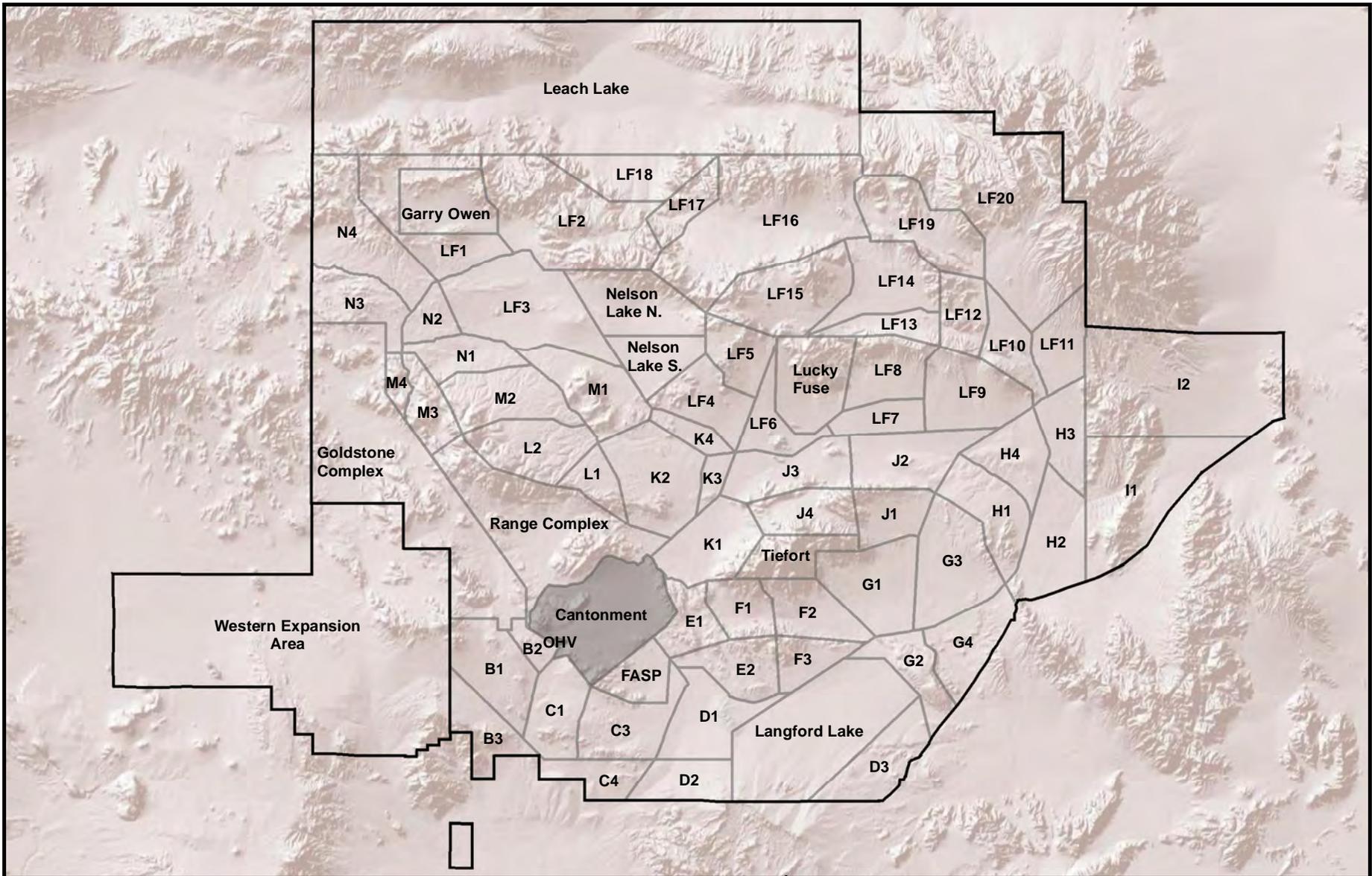


Figure 3.2-4
Training Areas
Fort Irwin EA/ICRMP

SCALE: 1 in = 6 miles DATE DRAWN: MAY 25, 2016



Legend

-  Installation Boundary
-  Training Areas

NASA Goldstone Deep Space Communications Complex

The GDSCC is operated by the Jet Propulsion Laboratory. Limited military training activities occur on GDSCC. During critical NASA missions at the Complex, military use is curtailed almost completely, and some restrictions extend to other portions of Fort Irwin. Fort Irwin has ultimate responsibility for the management of natural and cultural resources on GDSCC, but NASA has its own environmental program for the area (Army, 2006).

Conservation Areas

Two federally listed species occur within the boundaries of Fort Irwin. The desert tortoise is listed as threatened by the U.S. Fish and Wildlife Services (USFWS) and under the California Endangered Species Act. The Lane Mountain milkvetch is listed as endangered by the USFWS. Figure 3.4-1 depicts designated conservation areas for the desert tortoise and the Lane Mountain milkvetch.

Conservation of suitable habitat is critical to the survival of high density populations capable of colonizing the surrounding area. Conservation areas located within the geographic range of sensitive species have been established. Fort Irwin conservation areas are fenced, signed, and off limits to the military. Entry is permitted for research, monitoring, and land management purposes only.

Off Limits and Restricted Areas

Many off limits and restricted areas are specifically related to protecting cultural and natural resources (Figure 3.2-3). There is also a multi-use recreation area immediately southwest of the Cantonment Area that is off limits to training and offers horseback riding, recreational hiking, camping, and biking. Restricted areas include Restricted Dig Areas and No Dig Areas. No Dig Areas restrict use to certain types of training, but no digging is to occur as they may contain unexploded ordnance from past training activities and potential exposure to hazardous materials. Restricted Dig Areas allow certain digging activities to occur but only when specific safety guidance and equipment are used.

3.2.2 Environmental Consequences

Impacts to land use planning and aesthetics would be considered significant if the following occurred:

- Inconsistency with applicable federal, state, and local land use policy, plans, and/or designations;
- Loss of access to private or public land;
- Substantial degradation of the existing visual or aesthetic character or quality of the site and its surroundings; or
- A new source of substantial light or glare, which would adversely affect day or nighttime views in the area.

Proposed Action

Implementation of the ICRMP is not anticipated to result in any significant impacts to land use or aesthetics. Individual projects undertaken as part of the ICRMP could result in minor impacts. However, the ICRMP establishes procedures for project permitting, plan review, accessing inventories, conducting resource surveys, coordinating early in the planning process, actions to be taken when there is a discovery of unexpected resources, and protection of existing resources. From this perspective, the Proposed Action should benefit land use and aesthetics, as additional resources may become identified, managed and potentially protected.

No Action Alternative

No significant impacts to land use are expected under the No Action Alternative. However, failure to implement the ICRMP and associated activities could result in non-compliance, poor management, and violations of resource protection regulations. Additionally, inadvertent damage to land use resources because of lack of inventory and awareness could interrupt the mission and result in minor to significant long-term indirect impacts on troop readiness or result in a reduction of available land for military training.

3.3 Geology, Soils, and Mineral Resources

Geologic resources consist of naturally formed minerals, rocks, and unconsolidated sediments. Soil refers to the uppermost layers of surficial geologic deposits and is developed by the weathering of those deposits. Potential concerns associated with the geologic setting at Fort Irwin that could either affect or be affected by the Proposed Action, include physiography, geologic formations, seismicity, material site use (mining), and soils.

This section describes the affected environment and environmental consequences for geology, soils, and mineral resources within the ROI.

3.3.1 Affected Environment

The ROI for geology, soils, and mineral resources that could potentially be affected by the Proposed Action occurs within the Fort Irwin boundary located within the Mojave Desert.

Physiography

Fort Irwin is located in the north central part of the Mojave Desert, a geologically complex structural block that is bounded on the southwest by the San Andreas Fault and on the northwest by the Garlock Fault. Within this block, Fort Irwin is located in a region of north-south trending faults that collectively are referred to as the Eastern California Shear Zone. The Fort Irwin area is a region of numerous mountain ranges and broad, isolated alluvial valleys. Many valleys contain dry lakes referred to as playas (Figure 3.2-3). Fort Irwin terrain varies from level, barren lowlands and playas to steep, rugged mountains. The elevation of the Mojave Desert ranges from approximately 279 feet below mean sea level (msl) to approximately 11,918 above msl (amsl) at the top of Charleston Peak. The elevation within the boundary of Fort Irwin ranges from approximately 200 feet amsl to 6,153 feet amsl, with the average elevation at 2,454 feet amsl.

The Basin and Range physiographic province is located to the east, and the Sierra Nevada Range is located to the northwest of Fort Irwin. Fort Irwin covers an area of approximately 753,537 acres and contains several groundwater basins (see Figure 3.5-1). The cantonment area is situated within the Irwin groundwater basin that is bound on the east-southeast by Beacon Hill, on the northwest by Northwest Ridge, on the west by Southwest Ridge, and on the south by low-lying hills that separate the Irwin groundwater basin from the Langford groundwater basin to the south. The cantonment area is located at an approximate elevation of 2,385 feet amsl. The nearest hill (Beacon Hill) to the east-northeast has an elevation of approximately 2,780 feet amsl (Army, 2011).

Geology

The California Division of Mines and Geology has divided California into eleven geomorphic provinces (Figure 3.3-1). Fort Irwin is located within the Mojave Desert province. Geologic formations at Fort Irwin range in geologic time from the Precambrian era (over 600 million years ago) to the Holocene era (11,000 years ago to present). In general, geologic formations in the region consist of the Avawatz Mountains, Paleozoic sediments, Triassic metasedimentary and metavolcanic rocks, and Tertiary sediments and volcanic rocks.

The Quail Mountains are located along the Garlock Fault zone and are composed generally of Mesozoic granitic and metamorphic rocks. Beacon Hill, situated to the east of Fort Irwin, is composed primarily of metamorphic bedrock with inclusions of limestone and granite. Similar bedrock is exposed to the south in low-relief hillocks (Army, 2011).

Unconsolidated deposits include alluvium (clay, silt, sand, and gravel), aeolian (dune) sand, and playa deposits. In some areas of Fort Irwin, the alluvial materials result in clean sands and gravels that serve as water-bearing units. Other alluvial deposits contain fine-grained material, including silts and clays. In general, alluvium increases in thickness from edges of basins to their central floors. Alluvial valley fill forms the most important water-bearing unit in the vicinity of Fort Irwin. Numerous dry lakes exist at Fort Irwin and are designated as off limits areas (Figure 3.2-3). The thickness of deposits underlying many of these dry lakes is unknown; however, playa deposits of the Mojave Desert generally range from a few feet to 100 feet thick (Army, 2011).

Seismicity

The Mojave Desert region, including Fort Irwin, has experienced moderate seismicity in the past. The Mojave Desert is bound on the west by the northwest-southeast-trending San Andreas Fault and on the north by the east-west-trending Garlock Fault. The Mojave Block is the term used to generally describe the area between these faults that define the Mojave Desert. Death Valley Fault, located northeast of Fort Irwin, is a right-lateral, strike-slip fault that extends along the northeastern Avawatz Mountains and eastern Soda Mountains. Segments of Death Valley Fault have exhibited evidence of movement within the past 10,000 years. Garlock Fault, located north of Fort Irwin, is a major east-west trending fault in California. Garlock Fault is a strike-slip fault with left-lateral displacement and separates the Basin and Range Province from the Mojave Desert Province. Seismicity has been observed along the eastern portion of Garlock Fault. The Death Valley and Garlock Fault zones intersect in the eastern portion of Fort Irwin (USGS, 2015). The eastern termination of Garlock Fault is approximately 30 miles north of the cantonment area. Other faults in the region include the Mule Spring Fault, Manix Fault, an unnamed fault that runs between East Cronese Lake and Red Pass Lake, several faults in the Soda Mountains, Tiefert Mountains, and Granite Mountains, and a fault along the northwest flank of the Silurian Hills. The Mule Springs Fault extends the length of the northern Avawatz Mountains, and the Manix Fault runs roughly parallel to Interstate 15, south of Fort Irwin (USGS, 2015). The California Geological Survey (CGS) has not identified Alquist-Priolo Fault-Rupture Hazard Zones in the cantonment area at Fort Irwin, although several faults in the Irwin groundwater basin show evidence of displacement during the past 1.6 million years (Army, 2011). The faults that show displacement include Bicycle Lake Fault, Garlic Springs Fault (which trends northwest from Garlic Spring and along the north edge of the cantonment area), a concealed fault that parallels Garlic Springs Fault about 1,300 feet to the south, and an unnamed fault

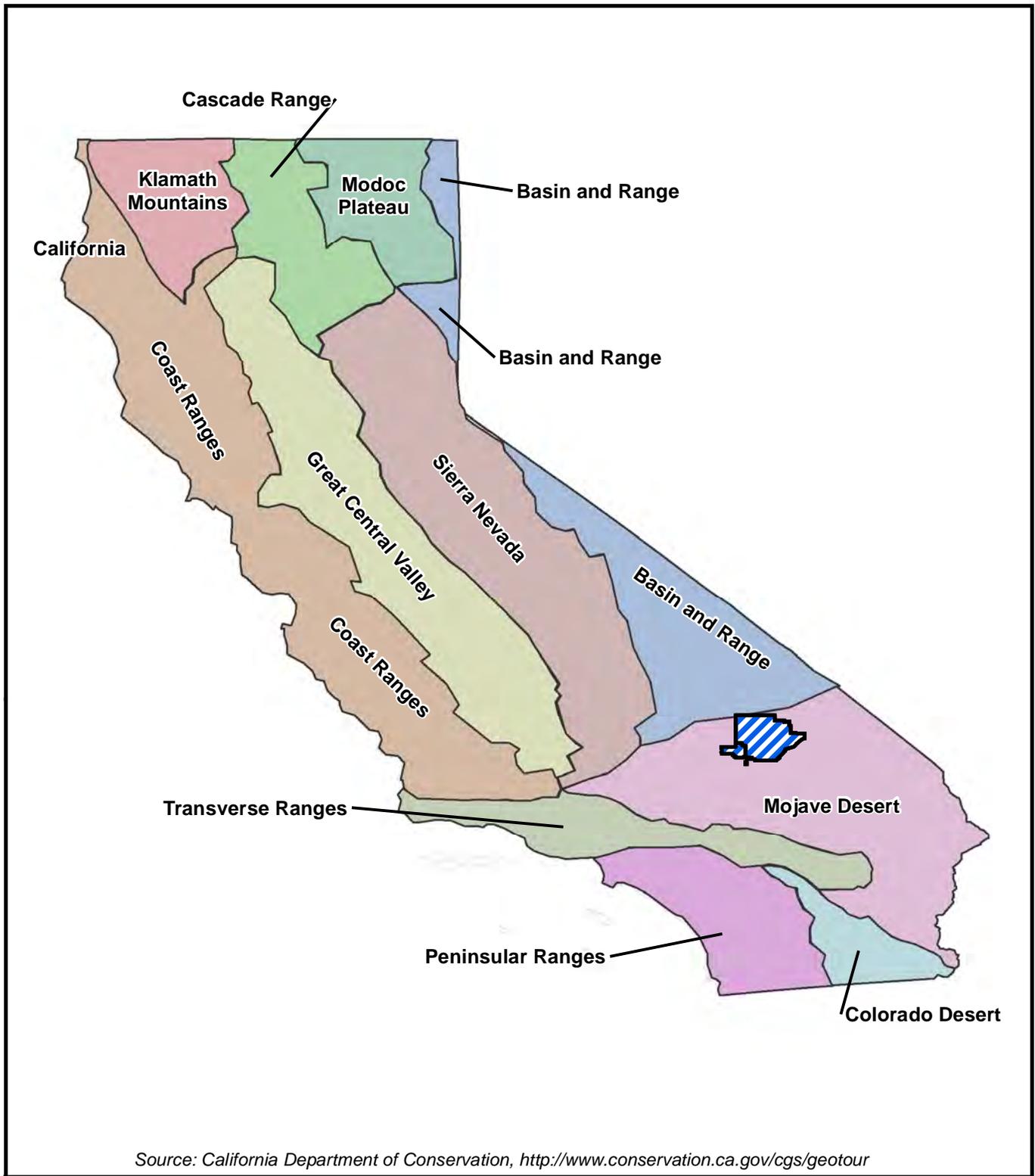
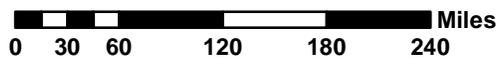


Figure 3.3-1
California Geomorphic Provinces

Fort Irwin EA/ICRMP

SCALE: 1 in = 110 miles DATE DRAWN: MAY 25, 2016



Legend

 Fort Irwin

that trends approximately east-west from south of Bicycle Lake across the cantonment area. None of these faults has been identified as being active within the past 11,000 years (Army, 2011). Active faults include the Calico-Hidalgo, the Garlock (East), and the Blackwater faults. Garlock (East) Fault, is located approximately 23.1 miles away and is capable of generating a maximum credible earthquake of magnitude 7.5.

Mineral Resources

Federal lands adjacent to Fort Irwin, managed by the BLM, allow exploration and development of mineral resources on multiple-use lands under its jurisdiction. Under the Mining Act of 1872 (30 U.S.C. § 21), U.S. citizens are given the opportunity to explore for, discover, and purchase certain valuable mineral deposits on unreserved public domain land. There are several areas within and adjacent to Fort Irwin where precious metals such as gold and silver reserves and geothermal resources potentially occur. However, geothermal resources are too low in temperature to have commercial value and no mining or exploration is carried out within the boundaries of Fort Irwin due to the exclusion signed by President Roosevelt in the 1940s (Army, 2011).

Soils

Soils found in the Mojave Desert region develop slowly and are fragile due to water being the main climatic limiting factor. Under hot, dry climate conditions and sparse vegetation, soil structure is poor due to the lack of organic matter. Soil particles smaller than rocks are intimately involved in the soil formation process; the main sizes are classified as sand, silt, and clay. Decomposing organic matter eventually acts as glue, causing clumping of the mineral particles, and is the primary factor in soil structure formation (CALIBRE, 2005).

In general, desert soils found on slopes are coarse-textured, light in color, and well drained. Clay soils that form in playas are fine-textured, darker in color, and poorly drained. Soil structure is poor due to the lack of organic matter; this usually reduces drainage when clay content is high. Desert soils often have chemical surface crusts, caused by lack of leaching action in low rainfall areas (CALIBRE, 2005). Soils form from erosion and bedrock decomposition. Bedrock breaks down into various-sized particles, ranging from boulders to colloids. Various-sized rocks on the ground surface can form a layer impervious to erosion, unless the surface is disturbed. Over time, a brown varnish often forms on the rock surface. An area containing a surface of rocks coated with this varnish is known as desert pavement (CALIBRE, 2005). Desert pavement consists of a surface crust of pebbles and rocks that have developed a coating of manganese oxide due to sun exposure, rendering the surface dark and shiny. Desert pavement results from wind movement on the sand; however, once formed, desert pavement protects fragile soils from further erosion. Once desert pavement is removed, re-establishment could take several thousand years (Army, 2011). The presence of desert pavement, mycorrhizal relationships, and cryptogamic crusts contributes to the fragile nature of the desert's soil surface. The sparse vegetation, often intense rainfall, large amounts of sand, and low amounts of organic matter result in desert soils being highly susceptible to erosion (CALIBRE, 2005). Desert soils that are disturbed are highly susceptible to wind and water erosion. In addition, desert soils are highly vulnerable to compaction. Activities such as vehicle movement disturb the soil crusts, leaving them vulnerable to erosion by wind and water (Army, 2011).

The higher mountains of Fort Irwin are excessively drained, very stony or rocky, sandy loams to sands that are derived from nearby parent material. These soils develop on strongly sloping to very steep

upland slopes of 9 to 75 percent. Rock outcrops cover 30 to 90 percent of the ground surface area. Where present, soil depth is seldom more than 10 inches (Army, 2006). Desert soils that develop on the alluvial fill at Fort Irwin are generally light in color, deficient in phosphorus and nitrogen, and lacking in organic matter.

3.3.2 Environmental Consequences

Impacts to geology, soils, and mineral resources would be considered significant if the following occurred:

- A geologic feature of unusual scientific value for study or interpretation would be disturbed;
- Geologic processes that would threaten human life or property (such as landslides or erosion) would be triggered or accelerated;
- Substantial alteration of topography would occur;
- Vehicular or other direct mechanical apparatus disturbs the upper dried clayey surface crust of dry lakebeds or playa deposits and exposes underlying fine sediment to wind erosion;
- Loss of established or potential mineral-bearing resources of economic value would occur; and/or
- Local mineral resources would be rendered inaccessible and therefore would require commodities to be transported from source areas at greater distances from the local markets.

Proposed Action

Implementation of the ICRMP is not anticipated to result in significant impacts to geologic, mineral, or soil resources. There would be no effects on geology because there is no work involved that extends to the level of subsurface geological formations.

Individual projects, such as cultural inventory surveys, undertaken as part of the ICRMP, could result in minor short-term impacts to soils, however with the implementation of BMPs outlined in section 3.12, soil disturbance and erosion will be minimized.

Natural and cultural resource conservation areas and dry lake playas are off limits for training. The protection of cultural resources within off limits areas inadvertently protects soil resources and vice versa. Additionally, under the INRMP, cultural resources management activities would be reviewed individually to evaluate potential soil impacts prior to the start of individual projects.

No Action Alternative

The No Action Alternative would have no effect on geology because no related work extends to subsurface geological formations.

Under the No Action Alternative, the ICRMP and cultural resources management activities that protect cultural resources would not be implemented. Failure to implement the ICRMP and associated activities could result in threats to cultural sites and their related soil resources. However, with the implementation of appropriate BMPs to prevent soil erosion and loss of topsoil, no new impacts are anticipated under this alternative.

3.4 Biological Resources

Biological resources include plants (flora) and animals (fauna) and the habitats in which they occur. Extra attention is placed on special-status species and those afforded some level of federal, state, or local protection. This section describes the affected environment and environmental consequences for biological resources within the ROI.

3.4.1 Affected Environment

The ROI for biological resources that could potentially be affected by the Proposed Action occurs within the Fort Irwin boundaries and the immediately adjacent areas. The adjacent areas include desert tortoise critical habitat as well as conservation areas on and adjacent to Fort Irwin for the desert tortoise and the Lane Mountain Milkvetch (Figure 3.4-1).

Regulatory Requirements

Several federal and state rules and regulations have been adopted, which serve to maintain, protect, and encourage biological resources in the region of Fort Irwin. 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.

Section 4 of the ESA directs the USFWS to develop recovery plans for the conservation and survival of a listed species. The USFWS drafted the *1994 Recovery Plan*, the *2004 Recovery Plan Assessment*, and the *2011 Revised Recovery Plan for the Mojave Population of the Desert Tortoise*. The main objective of the recovery plan is to delineate reasonable actions that are required to protect, recover, and eventually de-list the desert tortoise (*Gopherus agassizii*). The recovery plan offers guidelines for private, federal, and state cooperation in conserving threatened and endangered species and areas where such species are or historically have been distributed. Current management direction requires that any action must conform to any USFWS recovery plan for federally listed species.

The California Endangered Species Act (CESA) (Fish & Game Code 2050, et seq.) generally parallels the main provisions of the federal ESA and is administered by the California Department of Fish and Wildlife (CDFW). The CDFW is responsible for maintaining a list of threatened and endangered species. The CDFW also maintains a list of "candidate species" which are species that the CDFW has formally noticed as being under review for addition to either the list of endangered species or the list of threatened species. The CDFW also maintains lists of "species of special concern" which serve as "watch lists." Pursuant to the requirements of CESA, an agency reviewing a proposed action within its jurisdiction must determine whether any California-listed endangered or threatened species could be present in the project area and determine whether a proposed action would have a potentially significant impact on such species. In addition, CDFW encourages informal consultation on any proposed action that could affect a candidate species.

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

The Bald and Golden Eagle Protection Act (BGEPA), 54 Statute 251, as amended (16 USC Sections 668 through 668d), and the MBTA, provide for protection of the American bald and golden eagles. The BGEPA prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald or golden eagles, including their parts, nests, or eggs. The Secretary of the Interior can issue a permit for taking or transporting eagles for scientific, exhibition, and religious purposes or for transporting nests if the eagles interfere with resource development. Infrastructure must be built, installed, or expanded in such a manner as to avoid disturbing bald and golden eagles. If a nest is discovered in the affected area, a permit must be obtained to transport the nest to another site.

The Sikes Act (16 USC 670a–670f), as amended, requires the Secretary of Defense to provide for conserving and rehabilitating natural resources on military installations; for sustaining multipurpose use of the resources (including hunting, fishing, trapping, and nonconsumptive uses); and for public access to military installations, subject to safety requirements and military security. To facilitate the program, the Secretary of the Army is required to prepare and implement an INRMP. Fort Irwin has prepared an INRMP, which describes existing conditions and acts as a resource management guide for the installation.

Flora

Nine vegetation community types have been identified on Fort Irwin (Army, 2006); they include:

- Mojave Creosote Bush Scrub
- Blackbrush Scrub
- Mojave Mixed Woody Scrub
- Mojave Desert Wash Scrub
- Saltbush Scrub
- Alkali Sink Scrub
- Seeps and Springs
- Joshua Tree Woodland
- Juniper Woodland

These vegetation communities are described in the following sections.

Mojave Creosote Bush Scrub

Creosote bush scrub, an association dominated by the large shrub creosote bush (*Larrea tridentata*), is the most common vegetation type in the region, dominating about 70 percent of the Mojave Desert. Hence, creosote bush scrub is the most widespread community at Fort Irwin, occurring throughout the range below 3,600 feet (1,100 m) on alluvial slopes, valley floors, and mountain slopes (Army, 2006). A sub-association of this vegetation type is described as the creosote-burrobush association based on the codominance between creosote bush and burrobush (*Ambrosia dumosa*). Burrobush is a much smaller shrub that may often be numerically more abundant than creosote bush, but canopy cover and volume is generally dominated by creosote bush. Creosote bush and burrobush size and vigor are strongly influenced by water availability, and the largest individuals are characteristically found along edges of washes and roads (Army, 2006).

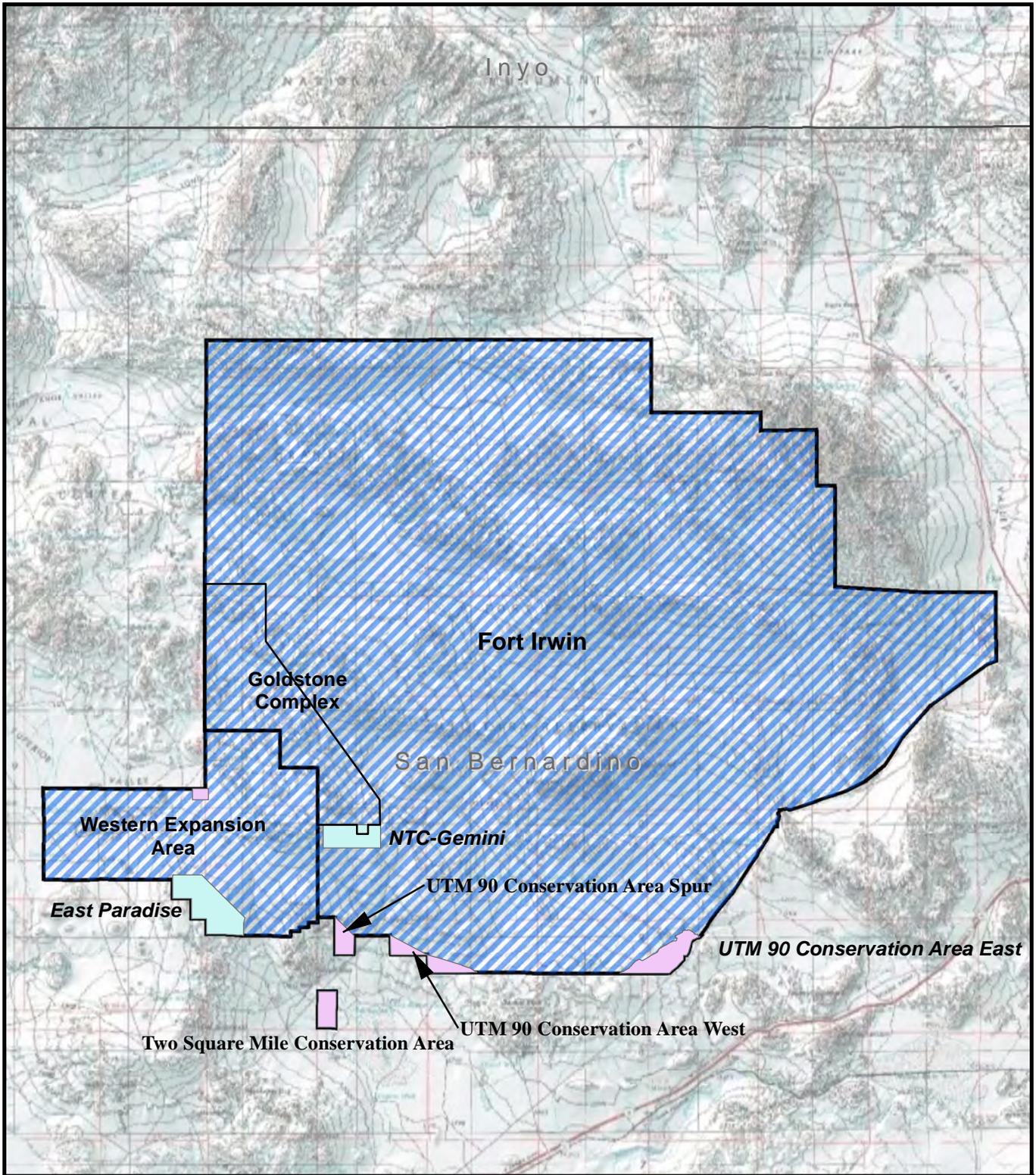
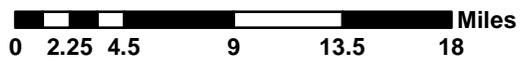


Figure 3.4-1
Conservation Areas
Fort Irwin EA/ICRMP

SCALE: 1 in = 8 miles DATE DRAWN: MAY 25, 2016



Legend

-  Desert Tortoise Conservation Area
-  Lane Mountain Milkvetch Conservation Area

Many subdominant shrubs occur in creosote bush scrub, including range rhatany (*Krameria erecta*), silver cholla (*Opuntia echinocarpa*), Anderson's boxthorn (*Lycium andersonii*), desert straw (*Stephanomeria pauciflora*), wishbone bush (*Mirabilis bigelovii*), and cheesebush (*Hymenoclea salsola*). At higher elevations subdominants include California buckwheat (*Erigonum fasciculatum*), hopsage (*Grayia spinosa*), winter fat (*Krasheninnikovia lanata*), and bladdersage (*Salazaria mexicana*) (Army, 2006).

Blackbrush Scrub

Creosote bush scrub is replaced by blackbrush scrub (*Coleogyne ramosissima*) above elevations of 3,600 to 5,900 feet (1,100 to 1,800 m). Blackbrush scrub occurs on upper alluvial fans and mountain slopes. It often occurs as monotypic stands; however, on Fort Irwin, it grows with a number of shrubs, including turpentine bush (*Thamnosma montana*), Mormon tea (*Ephedra nevadensis*), goldenbush (*Ericameria linerifolia*), hopsage, and needle grass (*Achnatherum speciosum*). Scattered junipers (*Juniperus californica*) occur as a canopy for blackbrush scrub and are discussed separately below. Blackbrush scrub occurs on slopes above Drinkwater Springs in the Granite Mountains and in higher elevations of the Avawatz Mountains in the vicinity of Cave Springs (Army, 2006).

Mojave Mixed Woody Scrub

Mojave mixed woody scrub is a heterogeneous assemblage of shrubs that grows in steep, rocky, granitic, or volcanic slopes. Mixed woody scrub at Fort Irwin consists of many cacti, Spanish bayonet (*Yucca schidigera*), and species of Brickellia, Ericameria, Ephedra, and Encelia. Examples of this scrub type on granitic soils occur in southern passes in Leach Lake Gunnery Range and steep slopes of the Avawatz and Granite mountains (Army, 2006).

Mojave Desert Wash Scrub

Mojave desert wash scrub is a low, shrubby, diverse community occurring in open washes, arroyos, and canyons throughout the desert. Periodic flooding in these areas maintains the open character of this community. Representative shrubs include spiny senna (*Senna armata*), rayless encelia (*Encelia frutescens*), cheesebush, desert almond (*Prunus fasciculata*), indigo bush (*Psorothamnus arborescens*), and sandpaper plant (*Petalonyx thurberi*). In some areas, this community may have scattered small tree species (Army, 2006).

Saltbush Scrub

Saltbush scrub is characterized by the dominance of one or more species of saltbush. Saltbush scrub is associated with moderately alkaline soils toxic enough to inhibit most desert shrubs that occur in the creosote bush scrub. It commonly occurs on lower bajada slopes (alluvial material at the foot of an escarpment or mountain) and plains and around playas (dry lakes usually located in valleys) throughout most of the desert. Good examples of saltbush scrub can be found on playas along margins of dry lakes on Fort Irwin. Common saltbushes include shadscale (*Atriplex confertifolia*), Mojave saltbush (*A. spinifera*), four-winged saltbush (*A. canescens*), and allscale (*A. polycarpa*). Other shrubs found in association with saltbush scrub include budsage (*Artemisia spinescens*), winterfat, hopsage, and Anderson's boxthorn. Typically, one strongly dominant species of saltbush is found in association with a smaller number of less dominant saltbush species in a particular area. The invasive Russian thistle (*Salsola tragus*), commonly known as tumbleweed, can often be found in saltbush scrub, especially in sandy areas. A large, dense stand of this species occurs in the southwestern portion of Langford Lake, around Drinkwater Lake, and in sandier portions of the central corridor (Army, 2006).

Alkali Sink Scrub

Alkali sink scrub occurs where soil salinities are very high and, as such, supports only the growth of halophytic plants. Alkali sink scrub occurs on poorly drained soils, often composed of clay, with a high water table and high alkalinity. The only known site of alkali sink scrub on the installation is found within a narrow belt, west of Bitter Springs. Plant species that make up this community include iodine bush (*Allenrolfea occidentalis*), bush seepweed (*Suaeda mocquini*), and saltgrass (*Distichlis spicata*) (Army, 2006).

Seeps and Springs

Unique assemblages of low-growing perennial herbs and phreatophytic trees and shrubs occur in the vicinity of permanently wet or moist soils around seeps and springs. These types of species occur at most springs on Fort Irwin. The volume of water and nature of the seep or spring usually dictate the abundance and diversity of the vegetation. Emergent aquatic species may include common reed (*Phragmites australis*), cattails (*Typha*), rushes (*Juncus*), and sedges (*Scirpus*). Honey mesquite, desert willow (*Chilopsis linearis*), and species of willow (*Salix*) and cottonwoods (*Populus*) are also present. Screwbean mesquite (*P. pubescens*), a species less tolerant of salt, occurs at Paradise Springs just south of the Western Expansion area along with honey mesquite. Both species of mesquite are found at Garlic Springs just south east of the cantonment area, where a rich assemblage of species occurs. Equally diverse, but very different, aquatic flora occur at Two Springs and the lower zone of Leach Spring (Army, 2006).

Joshua Tree Woodland

Joshua tree woodland is open woodland that occurs on gentle alluvial slopes with well-drained sandy, loamy, or gravelly soils. The Joshua tree (*Yucca brevifolia*) is usually the only native arborescent species and, when it occurs in higher densities, constitutes a woodland setting. Associated shrub species include creosote bush, bursage, California buckwheat, hopsage, bladdersage, and range rhatany. Joshua tree woodland is weakly developed on Fort Irwin. It is best developed in the northern part of the Goldstone Complex and on bajada slopes in the Avawatz Mountains. There are extensive stands with large, many-branched individuals in the Western Expansion Area (Army, 2006).

Juniper Woodland

One stand of juniper woodland occurs on Fort Irwin on the highest peak in the Avawatz Mountains. This community occurs on steep slopes and ridges and is a diverse assemblage of low shrubs and small juniper trees. Associated species include California buckwheat, blackbush, desert sandwort (*Arenaria macradenia*), and needle grass (Army, 2006).

Special Status

Flora

Special status species are listed as threatened or endangered, proposed for listing, candidates for listing by the state and/or federal government, California species of concern, or designated as sensitive by the BLM. Also included are plants identified by the California Native Plant Society (CNPS) as rare, threatened, endangered, or of limited distribution in California.

The Lane Mountain milkvetch (*Astragalus jaegerianus*) was listed as endangered by the USFWS on October 6, 1998, is included on the CNPS California Rare Plant Ranking System (CNPS Ranking System) under 1B, and is the only federally listed plant species on Fort Irwin. Plants with a California Rare Plant Rank of 1B are rare throughout their range with the majority of them endemic to California. Most of the plants that are ranked 1B have declined significantly over the last century. All of the plants constituting California Rare Plant Rank 1B meet the definition in the CESA, and are eligible for state listing (CNPS, 2015).

The Lane Mountain milkvetch occurs in Joshua tree woodland, mixed Mojave scrub, and creosotebush scrub in poorly developed sandy or granitic gravelly soils. Populations of Lane Mountain milkvetch were encountered at elevations from 3,100-4,200 feet above mean sea level, generally in areas of small ridges, shallow bedrock, and granitic soils. These are areas in Mojave creosote bush scrub and Mojave mixed woody scrub communities with diverse shrub assemblages. The most common host shrubs for the Lane Mountain milkvetch were turpentine bush, burrobrush, California buckwheat, Coopers goldenbush (*Ericameria cooperii*), and Mormon tea. Approximately 15,257 acres of Lane Mountain milkvetch are located on Fort Irwin (Army, 2006). Most of the population exists within the Western Expansion area (East Paradise population) and several areas adjacent to the southern boundary of the Goldstone Complex (NTC-Gemini population). These areas have been fenced and marked with signage to indicate that they are off limits and designated conservation areas (Figure 3.4-1).

The alkali mariposa lily (*Calochortus striatus*) is a federal USFWS Species of Concern, a BLM Sensitive Species, a California State Species of Concern, and is included on the CNPS Ranking System under 1B. The alkali mariposa lily is found in creosote brush scrub communities in the Mojave Desert. It has been observed at Two Springs and at nearby Paradise Springs (Army, 2006). It is a small, erect member of the lily family (*Liliaceae*), standing 1-4 decimeters (dm) high with long narrow leaves extending from the base of the plant. The flower is bell-shaped with lavender petals that are strongly purple-veined. It has been reported in the California Mojave Desert in small scattered populations in Kern, Los Angeles, and San Bernardino counties. Its range extends to Las Vegas in western Nevada. Alkali mariposa lily grows in alkaline meadows and moist creosote bush scrub plant communities. It flowers in the spring between April and June.

Populations of Clokey's cryptantha (*Cryptantha clokeyii*) are uncommon but have been observed in rocky areas surrounding Superior Valley and Paradise Valley. This species is on the CNPS Ranking System under 1B. It is a small annual in the *Boraginaceae* family. Plants typically occur in gravelly areas of coarse colluvium substrate and are most frequently found on upper slopes.

The small-flowered androstephium (*Androstephium breviflorum*) is included on the CNPS Ranking System under 2B. Plants with a California Rare Plant Rank of 2B are rare, threatened, or endangered in

California, but more common elsewhere (CNPS, 2015). Small-flowered androstephium is a white-flowered perennial herb of the lily family (*Liliaceae*). In California, small-flowered androstephium primarily occurs in open sandy flats and in bajadas at low to moderate elevations (Army, 2006).

The desert cymopterus (*Cymopterus deserticola*) is designated as sensitive by the BLM and is included on the CNPS Ranking System under 1B. This herbaceous perennial in the carrot family (*Apiaceae*) is found on deep, loose, well-drained sandy soil that occurs on alluvial fans and basins. The desert cymopterus also occurs on stabilized low sand dune areas and occasionally on sandy slopes. One population of desert cymopterus is known on Fort Irwin from a site in the Superior Valley, which is located just south of the NAWS China Lake boundary. Several additional populations, probably containing several thousand plants, were observed during a survey of the Superior Valley (Army, 2006). In 2004, as a result of an objective in the INRMP, Fort Irwin set aside a 364-acre Desert Cymopterus Conservation Area that has been fenced and marked with signage to indicate that it is off limits.

The Barstow woolly sunflower (*Eriophyllum mohavense*) is a federal Species of Concern, a BLM sensitive species, and is included on the CNPS Ranking System under 1B. Barstow woolly sunflower is a small annual in the sunflower family (*Asteraceae*) and typically occurs in creosote bush scrub that is at times adjacent to, or within, an overstory of Joshua trees and saltbush scrub. The Barstow woolly sunflower is found in open, flat, barren sites, most commonly on the sandy margins of alkali depressions distributed among the more common creosote bush plant community. The extent of the range of the Barstow woolly sunflower occurs within the west-central Mojave Desert. All known locations of Barstow woolly sunflower are located south, southwest, and west of Fort Irwin, with the closest known population located in Coolgardie Mesa, about 5 miles outside Fort Irwin (Army, 2006).

The Mojave monkeyflower (*Mimulus mohavensis*) is a federal Species of Concern and is included on the CNPS Ranking System under 1B. An annual plant, the Mojave monkeyflower is a member of the figwort family (*Scrophulariaceae*), found in Joshua tree woodland and creosote bush scrub, primarily in granitic soils on gravelly banks of desert washes, in sandy openings between creosote bushes, and along badland slopes above washes (areas that are not subject to regular water flows). The species range is within the Mojave Desert of California, generally occurring south of Fort Irwin, with the highest density of occurrence in areas just south of Daggett and Barstow (Army, 2006).

Fauna

Wildlife present at Fort Irwin consists of a variety of species adapted to desert scrub habitats that provide little cover and xeric conditions. Increased wildlife diversity could be attributed to isolated seeps and springs that provide perennial sources of water and vegetative cover. Rocky terrain provides additional cover and habitat for various reptile, rodent, bat, and bird species. Playas could support seasonal wetlands or pools with brine shrimp, which in turn support migratory waterbirds. Lack of specialized aquatic habitat contributes to the absence of native amphibian and fish populations at Fort Irwin. Game species at Fort Irwin include quail, dove, chukar partridge, cottontail rabbit, jackrabbit, and coyote. Descriptions of wildlife species that have the potential to occur at Fort Irwin are described in the following sections.

Small mammals that are commonly observed at Fort Irwin are the western pipistrelle (*Pipistrellus hesperus*), California myotis (*Myotis californicus*), blacktailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), and whitetailed antelope squirrel (*Ammospermophilus leucurus*). Small rodent species include kangaroo rats (*Dipodomys spp.*), pocket mice (*Chaetodipus formosus*; *Perognathus spp.*), and field mice (*Peromyscus sp.*). Desert woodrat (*Neotoma lepida*) and Botta's pocket gopher (*Thomomys bottae*) are also common. Larger mammals include badger (*Taxidea taxus*), kit fox (*Vulpes macrotis*), grey fox (*Urocyon cinereoargenteus*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), mountain lion (*Felis concolor*), and bighorn sheep (*Ovis Canadensis*). The kit fox and coyote are expected to occur throughout the area, whereas the others are localized and fairly rare. Abandoned mines, natural caves, trees, and manmade structures throughout the installation provide potential roosting habitat for bats. Bats also use the many cliff faces and rocky ledges of mountain ranges as sites for roosting and have the potential to use Joshua trees as night roosts.

Most bird species that occur at Fort Irwin are representative of creosote scrub habitat. Some common bird species include the blackthroated sparrow (*Amphispiza bilineata*), rock wren (*Salpinctes obsoletus*), horned lark (*Eremophila alpestris*), common raven (*Corvus corax*), and greater roadrunner (*Geococcyx californianus*). Representative birds that concentrate in the immediate vicinity of water at Fort Irwin include the house finch (*Carpodacus mexicanus*), phainopepla (*Phainopepla nitens*), northern mockingbird (*Mimus polyglottos*), and song sparrow (*Melospiza melodia*). Numerous birds occur as winter or summer residents or migrants that occur only during brief periods in the spring and fall. Other common species include the yellow-rumped warbler (*Dendroica coronata*), Hutton's vireo (*Vireo huttoni*), cliff swallow (*Hirundo pyrrhonata*), ruby-crowned kinglet (*Regulus calendula*), and white-crowned sparrow (*Zonotrichia leucophrys*). Raptors, which may occur, include red-tailed hawks (*Buteo jamaicensis*), northern harriers (*Circus cyaneus*), golden eagles (*Aquila chrysaetos*), and prairie falcons (*Falco mexicanus*). Owls that have the potential to occur at Fort Irwin include the burrowing owl (*Speotyto cunicularia*) and barn owl (*Tyto alba*). Most bird species at Fort Irwin are protected under the MBTA.

Mojave creosote bush scrub supports a diverse assemblage of reptiles including common lizards such as zebra-tailed lizards (*Callisaurus draconoides*), side-blotched lizards (*Uta stansburiana*), desert spiny lizards (*Sceloporus magister*), and western whiptails (*Cnemidophorus tigris*). Less common lizards might include the desert horned lizard (*Phrynosoma platyrhinos*), long-nosed leopard lizard (*Gambelia wislizenii*), and desert iguana (*Dipsosaurus dorsalis*). Habitat specialists might include the collared lizard (*Crotaphytus collaris*), the chuckwalla (*Sauromalus obesus*), long-tailed brush lizard (*Urosaurus graciosus*), and the common (desert) night lizard (*Xantusia vigilis*). Common snake species include the coachwhip (*Masticophis flagellum*), gopher snake (*Pituophis melanoleucus*), western patch-nosed snake (*Salvadora hexalepis*), western shovel-nosed snake (*Chionactis occipitalis*), and sidewinder (*Crotalus*

cerastes). Less common species include the blind snake (*Leptotyphlops humulis*) and ground snake (*Sonora semiannulata*). Unlike lizards that are primarily diurnal, most snake species on the installation are nocturnal.

Special Status Fauna

The Mojave population of desert tortoise (*Gopherus agassizii*) is designated as threatened by the USFWS and under the ESA. The USFWS determined that the Mojave population of the desert tortoise warranted listing in response to documented population declines over large portions of its range. The decline is thought to be due to a number of reasons, including upper respiratory tract disease, exacerbated by the stress of several drought seasons, loss of habitat, predation by ravens, livestock grazing, and direct disturbance by humans.

A small portion of Fort Irwin, along its southern boundary, the Western Expansion area, and a portion of GDSCC is within the Superior-Cronese Critical Habitat Unit designated by the USFWS to protect the west Mojave population. The desert tortoise is known to occur throughout Fort Irwin in low numbers. Prior to a 2008 translocation which moved over 500 tortoises south of the installation boundary, the highest concentration of desert tortoise on Fort Irwin occurred along the southern boundary (Army, 2006). Four conservation areas have been established for the protection of desert tortoise:

- UTM 90 Conservation Area East,
- UTM 90 Conservation Area West,
- UTM 90 Conservation Area Spur, and
- Two Square Mile Conservation Area.

The Two Square Mile Conservation Area is located south of Fort Irwin; however, all four conservation areas occur within the Superior-Cronese Critical Habitat Unit. The combined acreage of the UTM 90 Conservation East and West areas is approximately 3,370 acres. The UTM 90 Conservation Area Spur is approximately 900 acres and the Two Square Mile Conservation Area is approximately 1,280 acres (CALIBRE, 2005). All conservation areas, with the exception of the Two Square Mile Conservation Area, have been fenced and marked with signage to indicate that they are off limits and designated conservation areas (Figure 3.4-1).

The desert tortoise is a large, herbivorous reptile found throughout much of the Mojave and Sonoran deserts; its range roughly approximates the distribution of creosote bush scrub. The desert tortoise spends much of the year underground to avoid extreme temperatures during summer and winter. It constructs and maintains single-opening burrows, of which there may be several within an individual's home range. The desert tortoise is active in the spring, summer, and autumn when daytime temperatures are below 90°F (32°C). Most activity occurs during spring and early summer (Army, 2006).

The peregrine falcon (*Falco peregrines anatum*) was federally endangered in 1970, endangered under CESA in 1971, and federally delisted in 1999. Monitoring efforts directed by United States Environmental Protection Agency (EPA) through 2015, as a part of several recovery projects, allowed the delisting of the peregrine falcon from federally endangered under the ESA to federally protected under the MBTA (TNC, 2015).

The peregrine falcon is found primarily in the western United States. During winter they can be found throughout most of California. Summer range is more restricted to northern California, along the coast from Santa Barbara northward, and in the Sierra Nevada Mountains. Peregrines are uncommon winter migrants to the West Mojave. A peregrine falcon was observed at Bitter Springs in 1997 (Army, 2006).

The southwestern willow flycatcher (*Empidonax traillii extimus*) was listed as federally endangered in 1995 and the willow flycatcher (*Empidonax traillii*) was listed as endangered under CESA in 1991. The southwestern willow flycatcher breeds in riparian woodland habitats with willows, cottonwoods, and/or alders. A single willow flycatcher (subspecies unknown) was observed in mid-spring in the Hellwind Canyon drainage system (located in the Leach Lake Impact Area) during general wildlife surveys conducted there in 1993 and 1994. During avian surveys conducted in spring and fall 1994, several *Empidonax* species were observed during walking transects at two locations in the Avawatz Mountains in juniper and creosotebush dominant habitat, and near Bitter Springs. A transient willow flycatcher (subspecies unknown) was observed at King Springs during 2003 avian surveys. The southwestern willow flycatcher is a summer resident in the region and is not expected to occur regularly on Fort Irwin because of a lack of appropriate habitat. It may occur during brief periods of migration at springs and riparian areas (Army, 2006).

The Swainson's hawk (*Buteo swainsoni*) was listed as threatened under CESA in 1983. The Swainson's hawk was once a widespread breeder in the non-forested areas of northern California and the Central Valley. Conversion of the Central Valley and other grassland areas from pastureland to cropland has probably been a major factor in the population's decline (Army, 2006). The Swainson's hawk winters in South America. This species is migratory and is not expected to occur regularly at Fort Irwin or to forage in the area for prolonged periods. It has been observed at Bitter Springs (Army, 2006).

The Mohave ground squirrel (*Spermophilus mohavensis*) was listed as threatened under CESA in 1971. The Mohave ground squirrel generally occurs in habitat that consists of large, alluvial-filled valleys with deep fine- to medium-textured soils vegetated with creosote scrub, shadscale scrub, or alkali sink scrub (Army, 2006). The species is primarily granivorous, foraging on annual grasses and forbs within creosote scrub and shadscale scrub. Recent reports of Mohave ground squirrel populations at Fort Irwin are from the Western Expansion Area. Recent surveys east of the Gary Owen impact area and on GDSCC indicated no presence of this species. These surveys were concentrated in the southwestern, western and northeastern portions of the installation. Previous surveys indicated the presence of this species at 12 sites, including several in the vicinity of Goldstone Lake, the Echo site, Nelson Lake, Bicycle Lake, Drinkwater Lake, the north end of Lucky Fuse, and Lizard Gulch (Army, 2006). However, recent surveys of these areas indicated no presence of this species.

3.4.2 Environmental Consequences

Impacts to biological resources would be considered significant if the following occurred:

- Any loss of critical habitat and/or declining wildlife habitat which is sensitive or rare to the region (i.e., seasonal wetlands, stabilized and partially stabilized desert sand fields, stabilized and partially stabilized desert dunes);
- Any loss of individuals or populations of a federally listed or proposed endangered or threatened species or its habitat;
- Substantial loss of populations or habitat of a special status species, or otherwise regionally rare species that could jeopardize the continued existence of that species in the project region;

- Loss of at least five percent of undisturbed habitats within a biogeographic region, such as that found in a single valley, mountain range, or coastline;
- Substantial loss of natural vegetation communities that are slow to recover; or
- Substantial loss of native plant or animal species or community diversity.

Proposed Action

Implementation of the ICRMP is not anticipated to result in significant impacts to biological resources. Individual projects undertaken as part of the ICRMP, such as conducting ground surveys, may have short-term minor impacts to biological resources; however, under the INRMP, cultural resources management activities would be reviewed individually to evaluate potential biological impacts prior to the start of individual projects and with implementation of BMPs outlined in Section 3.12, impacts to biological resources will be minimized.

Additionally, natural and cultural resource conservation areas, dry lake playas, and desert tortoise habitat are off limits for training. The protection of cultural resources within off limits areas inadvertently protects biological resources and vice versa.

No Action Alternative

Under the No Action Alternative, the ICRMP and cultural resources management activities that protect cultural resources would not be implemented. Current protective measures are in place for biological resources and no new impacts are anticipated under this alternative. However, failure to implement the ICRMP and associated activities could result in threats to cultural sites and their related biodiversity, as well as cumulative irreversible damage to cultural sites and native ecosystems, which in turn could impact biological resources.

3.5 Water Resources

Water resources include both surface water and groundwater resources. Surface water refers to water on the Earth's surface, such as a stream, river, lake, or reservoir. Surface waters do not include artificial water courses or impoundments used exclusively for wastewater disposal. Groundwater refers to water that flows or seeps downward and saturates soil or rock, supplying springs and wells. This section describes the affected environment and environmental consequences for water resources and water quality within the ROI.

3.5.1 Affected Environment

The ROI for water resources that could potentially be affected by the Proposed Action occurs within Fort Irwin boundaries and the associated South Lahontan Hydrologic Region that contains 13 groundwater basins that fall entirely or partly within the boundary of Fort Irwin (Figure 3.5-1).

Regulatory Requirements

The U.S. Congress enacted the Clean Water Act (CWA) in 1972 to restore and maintain the chemical, physical, and biological integrity of the Nation's waters (33 U.S.C. 1251, *et seq.*). Section 404 of the CWA delegates jurisdictional authority over wetlands to the U.S. Army Corps of Engineers and the EPA. Waters

of the U.S. protected by the CWA include rivers, streams, estuaries, as well as most ponds, lakes, and wetlands.

The CWA prohibits the discharge of pollutants through a point source into a water of the United States unless a National Discharge Elimination System (NPDES) permit has been obtained. The permit contains limits on what can be discharged, monitoring and reporting requirements, and other provisions to ensure that the discharge does not harm water quality or people's health. The permit summarizes general requirements of the CWA Act into specific requirements tailored to the discharge operations.

The Safe Drinking Water Act of 1974 (SDWA) is the main federal law that protects the quality of drinking water in the U.S. Under the SDWA, the USEPA is required to set standards for drinking water quality and oversee state and local water suppliers who implement these standards. Drinking water standards are referred to as maximum contaminant levels (MCL). There are primary standards, which address health concerns, and secondary standards, which address esthetics such as taste and odor.

Under the California Health and Safety Code the State Water Resources Control Board administers the state-level Drinking Water Program with the goal to promote safe drinking water through more integrated water quality management, from source to tap. The State Water Resources Control Board has primary responsibility for regulating all public water systems. California has its own MCL standards, which are codified in Title 22 of the California Code of Regulations.

MCLs are adopted as regulations. They are health protective drinking water standards to be met by public water systems. MCLs take into account not only chemical contaminants' health risks but also factors such as their detectability and treatability, as well as costs of treatment. Health & Safety Code §116365(a) requires a contaminant's MCL to be established at a level as close to its primary health goal (PHG) as is technologically and economically feasible, placing primary emphasis on the protection of public health. PHGs are established by the California Office of Environmental Health Hazard Assessment (OEHHA). They are concentrations of drinking water contaminants that pose no significant health risk if consumed for a lifetime, based on current risk assessment principles, practices, and methods. OEHHA establishes PHGs pursuant to Health & Safety Code §116365(c) for contaminants with MCLs, and for those for which MCLs will be adopted. Public water systems use PHGs to provide information about drinking water contaminants in their annual Consumer Confidence Reports. Certain public water systems must provide a report to their customers about health risks from a contaminant that exceeds its PHG, about the cost of treatment to meet the PHG, and to hold a public hearing on the report.

The State Water Resource Control Board adopted regulations pertaining to the treatment, storage, processing, or disposal of solid waste are found in California Code of Regulations (CCR) Title 27. Discharges from water treatment plants are also regulated under CCR Title 27.

If discharges affect California's surface, coastal, or groundwater, a permit to discharge waste granted by the appropriate Regional Water Quality Control Board (Regional WQCB) may be required. For discharges such as those affecting groundwater or in a diffused manner (e.g., erosion from soil disturbance or waste discharges to land) a Report of Waste Discharge must be filed with the appropriate Regional Board in order to obtain Waste Discharge Requirements (WDR).

AR 200-1 establishes the following objectives for water resources on Army lands:

- Conserve all water resources.
- Control or eliminate sources of pollution to surface or ground waters through conventional or innovative treatment systems.
- Demonstrate leadership in attaining the national goal of zero discharge of water pollutants.
- Provide drinking water that meets applicable standards.
- Cooperate with federal, state, and local regulatory authorities in forming and implementing water pollution control plans.
- Control or eliminate runoff and erosion through sound vegetative and land management practices.
- Consider non-point source pollution abatement in all construction, installation operations, and land management plans and activities.

Surface Water

Surface water resources at Fort Irwin are scarce and no perennial watercourses exist in the region. Streams and water channels are intermittent, flowing to playas where ephemeral lakes are formed. This naturally occurring standing water is generally evident only during and immediately after heavy rains. Playas are flat dry lakebeds, and are exhibited on Figure 3.5-1.

Alluvial fans commonly are observed in and around Fort Irwin. During heavy rainfall events, bedload material composed of sand, gravel, cobbles, and rocks is deposited which forms the fans. Significant subsurface flows might occur in the unconsolidated sand and gravel channel deposits found in washes and alluvial fans, even after surface flows have ceased. Local groundwater recharge could occur along washes where water temporarily pools (Army, 2011).

Limited naturally occurring permanent surface water resources on Fort Irwin include six springs and one watershed. These resources produce meager to small quantities of water. Additionally, four intermittent springs produce little to no water during summer, depending on the amount of seasonal rainfall.

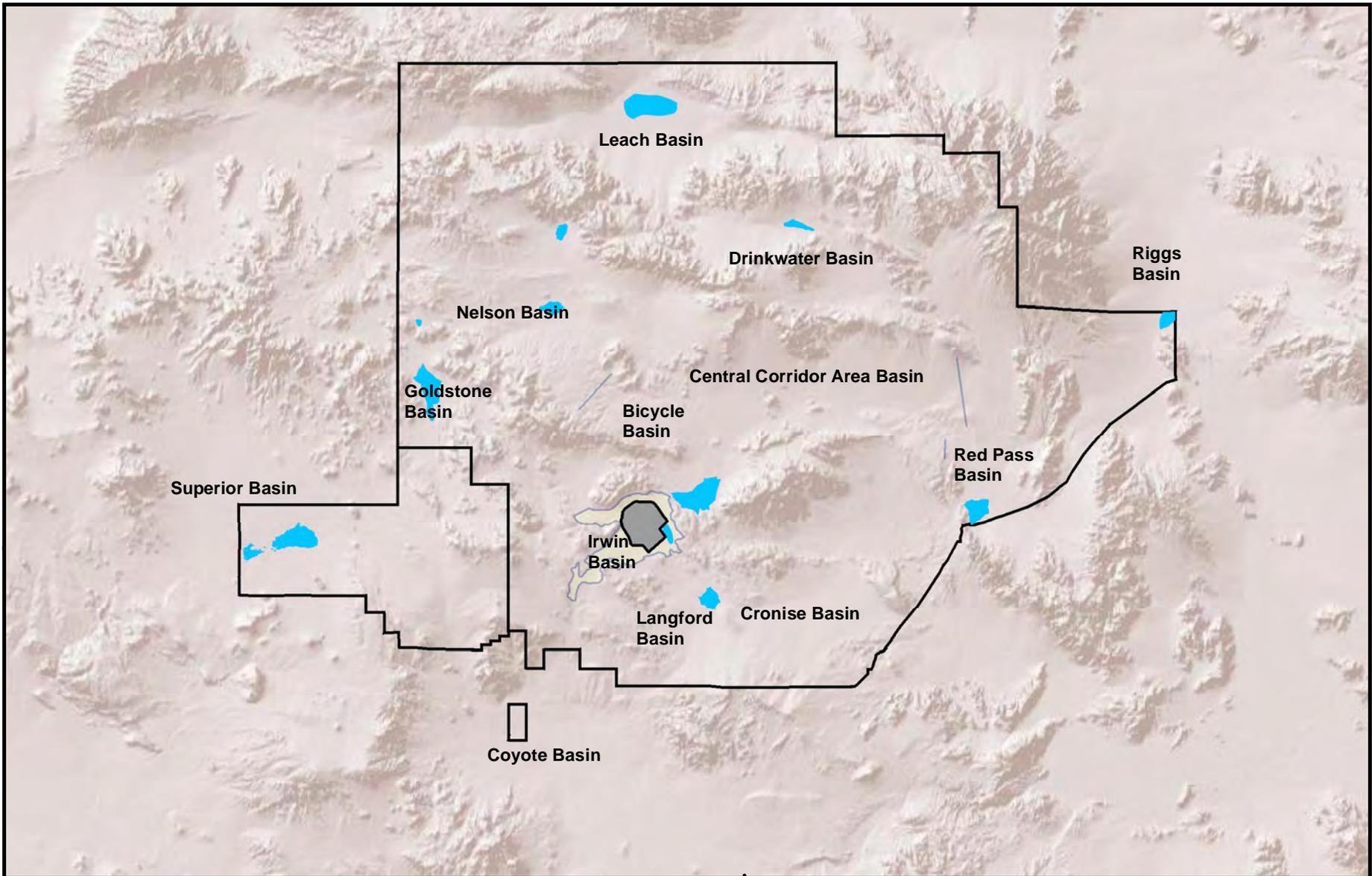
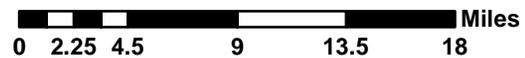


Figure 3.5-1
Groundwater Basins
Fort Irwin EA/ICRMP

SCALE: 1 in = 8 miles DATE DRAWN: MAY 25, 2016



Legend

- Cantonment
- Dry Lakes and Playas (Off Limit Area)
- Installation Boundary

Groundwater

Fort Irwin is located in the South Lahontan Hydrologic Region (DWR, 2003). Figure 3.5-1 exhibits 13 groundwater basins that fall entirely or partly within the boundary of Fort Irwin. These include, from north to south: Leach Basin, Drinkwater Basin, Riggs Basin, Nelson Basin, Goldstone Basin, Superior Basin, Central Corridor Area Basin, Red Pass Basin, Bicycle Basin, Irwin Basin, Langford Basin, Cronise Basin, and Coyote Basin (USGS, 2014).

In 2003 the California Department of Water Resources identified 10 basins in the Fort Irwin area, with one basin subdivided into 2 subbasins. However, as more detailed and recent groundwater investigations progressed, 2 additional basins have been divided into 2 subbasins each, with the net result that there are a total of 13 basins and subbasins. The Bicycle Valley Groundwater Basin was divided into the Bicycle and Nelson subbasins, and are referred to as Bicycle Basin and Nelson Basin; Red Pass Valley Groundwater Basin, which includes an area referred to by Fort Irwin as the Central Corridor area, was divided into Red Pass Basin on the east and Central Corridor Area Basin in the west; and Avawatz Valley Groundwater Basin is referred to as Drinkwater Basin, following the name used by Fort Irwin which refers to the Drinkwater playa in the northern part (USGS, 2014) of the installation.

Groundwater basins and subbasins are defined as alluvial aquifers or a stacked series of alluvial aquifers with reasonably well-defined boundaries in a lateral direction and a definable bottom. Furthermore, the mapped boundaries of these basins are non-water bearing deposits such as rock or sediments with very low permeability, or a geologic structure such as a fault. The groundwater basin boundaries are along low-lying topographic and drainage divides, some of which are simplified as straight-line boundaries between exposures of plutonic, metamorphic, or Miocene volcanic and sedimentary rocks (USGS, 2014). The water supply for Fort Irwin is groundwater that comes from a combination of three sources: 1) Bicycle Basin, located approximately two miles northeast of the cantonment area adjacent to Barstow Road; 2) Langford Basin, located approximately two miles southeast of the cantonment area adjacent to Langford Lake Road; and 3) Irwin Basin, located underneath the cantonment area. These aquifers are very similar to underground lakes, bordered by rising bedrock surrounding each basin, and form the hills visible on the surface. Fort Irwin is supported by groundwater supply wells from the three groundwater basins (USGS, 2003).

Fort Irwin pumped approximately 702 million gallons of water out of the ground during 2015. These basins are replenished by the small amount of rain received annually. Therefore, Fort Irwin pumps out much more water than received from rainfall, causing an overdraft (Fort Irwin, 2014). The USGS reported that since 1993, water levels have been recovering in the Irwin Basin in response to decreased pumping and continued artificial recharge of wastewater in the southeastern part of the basin (USGS, 2003).

Water Quality

Groundwater at the Irwin, Bicycle and Langford basins tends to contain high total dissolved solids (TDS) and various dissolved metals depending on the underlying bedrock composition. High levels of fluoride and arsenic are present in groundwater produced from the three groundwater basins that provide water to Fort Irwin (Lahontan Water Board, 2015).

Groundwater quality is characterized as being highly saline with TDS values ranging from 690 to 890 milligrams per liter (mg/L). Other inorganic constituents of concern (COC) include arsenic and fluoride,

concentrations which have been monitored as high as 40 micrograms per liter ($\mu\text{g/L}$) (Fort Irwin, 2015) and 11.0 mg/L (Army, 2015) respectively.

Domestic water supplied to Fort Irwin comes from the groundwater supply wells located in the Irwin Basin, Langford Basin, and Bicycle Basin. Water from water supply wells in the three basins is blended and processed by a reverse osmosis facility at Fort Irwin (Lahontan Water Board, 2015).

Fort Irwin has two fresh water systems, a reverse osmosis (RO) system and a domestic use (DU) system. The DU water is higher than the California MCL for fluoride (MCL = 2 mg/L) and arsenic (MCL = 10 $\mu\text{g/L}$) and is intended for use in washing, cleaning, irrigation, and other non-potable uses (Army, 2015). The RO system is used to remove contaminants and meet all drinking water standards including fluoride and arsenic (Army, 2014). A portion of the DU water is blended with the RO water to provide an adequate volume of drinking water while still achieving health standards that meet the MCL requirements.

The Army is building a new water treatment and distribution system, known as Irwin Water Works (IWW). IWW will treat groundwater for potable water supply by reducing dissolved inorganic ions to below drinking water standards. The IWW water treatment process includes electro-dialysis reversal (EDR), membrane filtration, reverse osmosis ion exchange, and mechanical evaporation. This process will remove or reduce primary target compounds such as arsenic, fluoride, nitrates, and total dissolved solids. Waste brine from the treatment process will be discharged to onsite evaporation ponds where it will be dried before off-site disposal (Lahontan Water Board, 2015). IWW will discharge waste brine water to nine evaporation ponds, regulated under a Waste Discharge Requirement issued by the Lahontan Regional Water Quality Control Board.

3.5.2 Environmental Consequences

Impacts to water resources are considered significant if:

- Groundwater table levels are reduced to such an extent that spring flows are diminished or production at existing wells within the basin or adjacent interconnected basins falls below economically feasible or practical engineering limits;
- Groundwater quality changes occur because of increasing salinity or mineral content that can negate the water's value for domestic, industrial, or agricultural consumption;
- Existing surface water drainage patterns are altered;
- The quality of ephemeral surface water resources available for wildlife at dry lakes, spring flows, or linear riparian systems with ephemeral flows is degraded; and/or
- Increases in water quality constituents could lead to a violation of specific state and Federal standards.

Proposed Action

Implementation of the ICRMP is not anticipated to result in significant impacts to water resources. The Proposed Action could have a long-term beneficial effect on surface waters, where they are located near cultural resources. The protection of cultural resources within off limits areas inadvertently protects surface water resources and vice versa. The ICRMP provides a comprehensive and uniform planning mechanism for protecting cultural resources, as well as the environment immediately surrounding them.

Water is vital to any desert ecosystem, and as such, the springs and playas are off limits to all training. Fort Irwin educates field personnel about the off limits nature of spring locations as part of major briefings prior to each military exercise. These briefings help to avoid impacts by military equipment and personnel on natural and cultural resources associated with spring areas. Fort Irwin erects fencing and metal crossbars at springs likely to be approached by wheeled and tracked vehicles in an effort to reduce accidental intrusion into and subsequent damage to these resources. In the event that soil disturbance and or erosion is likely to occur due to individual projects undertaken as part of the ICRMP, the BMPs outlined in Section 3.12 will be implemented to minimize impacts.

No Action Alternative

Under the No Action Alternative, the ICRMP and cultural resources management activities that protect cultural resources would not be implemented. Current protective measures are in place for water resources and no new impacts are anticipated under this alternative. However, failure to implement the ICRMP and associated activities could result in threats to cultural sites and their related potential water resources, as well as cumulative irreversible damage to cultural sites and native ecosystems, which in turn could impact water resources.

3.6 Air Quality

This section discusses, within the ROI, existing air quality for the Proposed Action, the regulatory framework governing air quality in the region, and the potential air quality impacts associated with the Proposed Action. Under federal law, state and local air quality regulations must be at least as stringent as federal regulations, and may be more stringent. This section describes the affected environment and environmental consequences for air quality within the ROI.

3.6.1 Affected Environment

Fort Irwin is located in the Mojave Desert Air Basin (MDAB) which falls under the jurisdiction of the Mojave Desert Air Quality Management District (MDAQMD), a part of the California Air Resources Board (CARB).

Fort Irwin experiences hot, dry summers, and mild to cold winters. Average summer (June-August) high and low temperatures in the nearby City of Barstow are 100°F and 65°F, respectively. Average winter (December-February) high and low temperatures in the City of Barstow are 61°F and 34°F. The area experiences infrequent rainfall (averaging 4.7 inches annually), little snow (averaging less than 1 inch annually), and moderate winds (WRCC, 2015). High particulate matter concentrations in the Mojave Desert are typically the result of wind erosion from exposed or disturbed land areas.

Regulatory Setting and Requirements

Several federal, state, and local jurisdictions, including the EPA, CARB, and MDAQMD, work to regulate air quality in the Fort Irwin region. Each jurisdiction has established rules and regulations to maintain air quality or to attain specific standards.

Federal Regulatory Setting

Federal Clean Air Act

The EPA has set National Ambient Air Quality Standards (NAAQS) for six primary air pollutants that are focused on improving air quality throughout the country (EPA, 2015a). The EPA established standards for each pollutant that must not be exceeded. Ambient air quality standards are discussed in more detail later in this section, the six NAAQS pollutants include the following:

- Carbon monoxide (CO),
- Lead (Pb),
- Nitrogen dioxide (NO₂),
- Ozone (O₃),
- Particulate matter (as PM₁₀ and PM_{2.5}), and
- Sulfur dioxide (SO₂).

The Federal Clean Air Act (CAA) allows states to set stricter standards. As a result, California has adopted its own set of more stringent standards, known as the California Ambient Air Quality Standards (CAAQS). The CAA also requires that each state adopt a State Implementation Plan (SIP) that outlines

regulations and programs that will be implemented to demonstrate how a state will attain or maintain ambient air quality standards within a given period of time.

The General Conformity Rule was established under the CAA (Section 176(c)(4)) to ensure that actions taken by federal agencies in nonattainment and maintenance areas do not interfere with a state's plans to meet national standards for air quality. The rule was first promulgated in 1993, with the most recent revisions adopted in March 2010.

The General Conformity Rule requires that federal actions that may result in direct and indirect emissions of criteria pollutants for which the action area is designated nonattainment or maintenance, conduct an air quality conformity determination to ensure that the action would not interfere with the applicable SIP. However, in order to limit the need to conduct conformity determinations for actions with minimal emission increases, and pursuant to 40 CFR 93.153(c), the General Conformity Rule also provides de minimis emission levels for criteria pollutants and precursor pollutants such as volatile organic compounds (VOC) and nitrous oxide (NO_x). If a proposed action's annual emissions are below the applicable de minimis levels, the project is not subject to a general conformity determination.

San Bernardino County is a federally designated nonattainment and maintenance area (EPA, 2015b). Under the General Conformity Rule, no federal agency can approve an action unless the action has been demonstrated to conform to the applicable air quality management plan or SIP. The CEQA and Federal Conformity Guidelines that apply to the MDAB are listed in Table 3.6-1. These levels apply to all direct and indirect annual emissions generated by the Proposed Action under federal agency control. A detailed conformity analysis is not required for proposed actions that result in emissions that are less than de minimis levels. The proposed action will include approval by a federal agency (the U.S. Army).

Table 3.6-1: CEQA and Federal Conformity Guidelines

Pollutant	Threshold (Tons/year)
NO _x	25
VOC ¹	25
SO ₂	25
CO	100
PM ₁₀	15
PM _{2.5}	15

Sources: MDAQMD Rule 2002, (1994) and MDAQMD Conformity Guidelines (2011)

Executive Order 13693

This EO, Planning for Federal Sustainability in the Next Decade, was signed by President Obama on March 19, 2015. EO 13693 supersedes EO 13514. EO 13693 defines three scope of emissions, which include the following: (a) scope 1: direct greenhouse gas emissions from sources that are owned or controlled by the Federal agency; (ii) scope 2: direct greenhouse gas emissions resulting from the generation of electricity, heat, or steam purchased by a Federal agency; and (iii) scope 3: greenhouse gas emissions from sources not owned or directly controlled by a Federal agency but related to agency activities such as vendor supply chains, delivery services, and employee travel and commuting. EO 13693 sets forth goals for reducing Greenhouse Gas (GHG) emissions from federal facilities.

State Regulatory Setting

California has 15 air basins under the jurisdiction of 35 air quality management districts that develop air pollution rules, oversee compliance, protection, and improvement of state and federal ambient air quality standards. Fort Irwin is located within the MDAQMD.

California Clean Air Act

The CARB has set ambient air quality standards to protect public health and welfare that are stricter than the NAAQS set by the EPA under the CAA. Under the California Clean Air Act of 1988 (CCAA), the CARB designated all air basins within the state as attainment, nonattainment, or unclassified for all criteria pollutants. CARB also required regional air quality management and control districts to develop and implement strategies to attain state ambient air quality standards. The CARB makes state area designations for an additional four criteria pollutants, compared to the federal standards. The additional four pollutants include the following:

- Sulfates,
- Hydrogen Sulfide,
- Ozone, and
- Visibility Reducing Particles.

California Air Toxics Program

California establishes the process for the identification and control of toxic air contaminants and includes provisions to make the public aware of significant toxic exposures and for reducing risk, under the AB2588 Air Toxics "Hot Spot" Program ("Hot Spot" Program). The Air Toxics "Hot Spots" Information and Assessment Act was enacted in 1987 (CARB, 2015a). The "Hot Spots" Program Emission Inventory Criteria and Guidelines (Guidelines) report provides direction and criteria to facilities on how to compile and submit air toxics emission data required by the "Hot Spots" Program. On November 16, 2006, the CARB presented to the Board proposals for amending the Guidelines to incorporate diesel PM into the "Hot Spots" Program. The Board approved the proposed amendments to the Guidelines with modifications.

Local Regulatory Setting

As previously mentioned, the State of California is divided into 15 air basins and 35 air districts that have primary responsibility to regulate and enforce air pollution from stationary sources. The MDAQMD is charged with monitoring the air in compliance with the CAA and the CCAA. The MDAQMD jurisdictional area is currently in attainment for all criteria pollutants under federal requirements. MDAQMD is non-attainment for PM₁₀ and Ozone under State requirements. The MDAQMD can require permits in the form of an Authority to Construct or a Permit to Operate. MDAQMD Rule 219 lists vehicles and transportation equipment as "specific equipment not requiring a permit" (MDAQMD, 2010).

Ambient Air Quality Standards

The CAA requires the EPA to set NAAQS for six common air pollutants. These commonly found air pollutants, known as criteria pollutants, are found all over the United States. They are PM, ground-level ozone (O₃), carbon monoxide (CO), sulfur dioxide (SO₂), nitrogen dioxide (NO₂), and lead (Pb). These

pollutants can harm human health and the environment, and cause property damage. Of the six pollutants, particle matter and O₃ are the most widespread health threats.

Criteria pollutant monitoring data is used in conjunction with ambient air quality standards (federal, state and local) to determine the attainment status of an area. Table 3.6-2 presents the ambient air quality standards applicable to Fort Irwin and the Proposed Action. The attainment status for the Proposed Action area is presented in Table 3.6-3 below and further discussed previously in the Regulatory Setting and Requirements Section above. Criteria pollutant emissions for the proposed action have been evaluated and are discussed in Section 3.6.2 Proposed Action. A description of each criteria pollutant is presented below.

Table 3.6-2: State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	California Standard ^{1,2}	National Standard ³	
			Primary ^{2,4}	Secondary ^{2,5}
Ozone	1 hour	0.09 ppm (180 µg/m ³)	NA ⁶	NA ⁶
	8 hour	0.070 ppm (137 µg/m ³)	0.070 ppm ⁶ (137 µg/m ³)	0.070 ppm ⁶ (137 µg/m ³)
PM ₁₀ ^{7,8}	24 hour	50 µg/m ³	150 µg/m ³	150 µg/m ³
	Annual arithmetic mean	20 µg/m ³	NA	NA
PM _{2.5} ⁸	24 hour	NA	35 µg/m ³	35 µg/m ³
	Annual arithmetic mean	12 µg/m ³	12 µg/m ³	15 µg/m ³
CO	1 hour	20 ppm (23 mg/m ³)	35 ppm (40 mg/m ³)	NA
	8 hour	9.0 ppm (10 mg/m ³)	9 ppm (10 mg/m ³)	NA
	8 hour (Lake Tahoe)	6 ppm (7 mg/m ³)	NA	NA
NO ₂ ⁹	1 hour	0.18 ppm (339 µg/m ³)	100 ppb (188 µg/m ³)	NA
	Annual arithmetic mean	0.030 ppm (57 µg/m ³)	0.053 ppm (100 µg/m ³)	0.053 ppm (100 µg/m ³)
SO ₂ ¹⁰	1 hour	0.25 ppm (655 µg/m ³)	75 ppb (196 µg/m ³)	NA
	3 hour	NA	NA	0.5 ppm (1,300 µg /m3)
	24 hour	0.04 ppm (105 µg/m ³)	0.14 ppm (365 µg/m ³)	NA
	Annual arithmetic mean	NA	0.030 ppm (80 µg/m ³)	NA
Lead ^{11,12}	30 day average	1.5 µg/m ³	NA	NA
	Calendar quarter	NA	1.5 µg/m ³	1.5 µg/m ³
	Rolling 3-month average	NA	0.15 µg/m ³	0.15 µg/m ³

Pollutant	Averaging Time	California Standard ^{1,2}	National Standard ³	
			Primary ^{2,4}	Secondary ^{2,5}
Visibility Reducing Particulates ¹³	8 hour	Extinction coefficient of 0.23 per kilometer – visibility of 10 miles or more (0.07 coefficient and 30 miles or more for Lake Tahoe) caused by particles when the relative humidity is less than 70 percent	NA	NA
Sulfates	24 hour	25 µg/m ³	NA	NA
Hydrogen Sulfide	1 hour	0.03 ppm (42 µg/m ³)	NA	NA
Vinyl Chloride ¹¹	24 hour	0.01 ppm (26 µg/m ³)	NA	NA

Notes:

µg/m³ Microgram per cubic meter

ppm Parts per million

ppb Parts per billion

mg/m³ Milligram per cubic meter

NA Not applicable

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM₁₀, PM_{2.5}, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
2. 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.
3. 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 µg/m³ is equal to or less than one. For PM_{2.5}, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.
4. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
5. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
6. Final Rule in Federal Register October 26, 2015, effective December 28, 2015. The 1997 ozone standard (0.08 ppm, annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years) and related implementation rules remain in place, however the standard has been revised to 0.070 ppm. In 1997, EPA revoked the 1-hour ozone standard (0.12 ppm, not to be exceeded more than once per year) in all areas, although some areas have continued obligations under that standard (“anti-backsliding”). The 1-hour ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1.
7. The EPA revoked the annual PM₁₀ NAAQS in 2006.
8. On December 14, 2012, the national annual PM_{2.5} primary standard was lowered from 15 µg/m³ to 12.0 µg/m³. The existing national 24-hour PM_{2.5} standards (primary and secondary) were retained at 35 µg/m³, as was the annual secondary standard of 15 µg/m³. The existing 24-hour PM₁₀ standards (primary and secondary) of 150 µg/m³ also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.
9. 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 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.
10. 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 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.
 11. The CARB 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.
 12. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 µg/m³ 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.
 13. In 1989, the CARB 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.

Sources: CARB, 2015b and FR, 2015.

Table 3.6-3: Mojave Desert Air Quality Management District Attainment Status for State and Federal Regulations

Criteria Pollutants	MDAQMD	
	State (CAAQS)	Federal (NAAQS)
Ozone (8 hour)	N	U/A
PM _{2.5}	U	U/A
PM ₁₀	N	U
CO	U	U/A
NO ₂	A	U/A
SO ₂	A	U
Sulfates	A	X
Lead	A	U/A
Hydrogen Sulfide	U	X
Visibility Reducing Particle	U	X

Source: CARB, 2014

Notes:

- A Attainment
- U Unclassifiable
- N Nonattainment
- X Not applicable, there is no federal standard

Particulate Matter (PM)

PM is a complex mixture of extremely small particles and liquid droplets. PM is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. The size of particles is directly linked to their potential for causing health problems. EPA is concerned about particles that are 10 micrometers in diameter or smaller because those are the particles that generally pass through the throat and nose and enter the lungs. PM is grouped into two categories; inhalable PM and fine or respirable PM. The first is PM larger than 2.5 micrometers and smaller than 10 micrometers in diameter and is called PM₁₀. The latter is 2.5 micrometers in diameter or smaller and is called PM_{2.5}.

PM₁₀ can be emitted directly or it can be formed many miles downwind from emission sources when various precursor pollutants interact in the atmosphere. Fugitive dust is a major source of PM₁₀. It is often found near roadways and dusty industries. Gaseous emissions of pollutants like NO_x, sulfur oxide (SO_x), VOC, and ammonia, given the right meteorological conditions, can form particulate matter in the form of nitrates, sulfates, and organic particles. These pollutants are known as secondary particulates, because they are not directly emitted, but are formed through complex chemical reactions in the atmosphere. These secondary ultra-fine particulates form PM_{2.5} and can be found in smoke and haze. Both PM₁₀ and PM_{2.5} can be directly emitted from sources such as forest fires, or can form when gases emitted from power plants, industry, and automobiles react in the air.

Ozone (O₃)

In the presence of ultraviolet radiation, both NO_x and VOC go through a number of complex chemical reactions to form O₃. Emissions from industrial facilities, electric utilities, motor vehicle exhaust, gasoline vapors, and chemical solvents are some of the major sources of NO_x and VOC, the precursors to O₃. O₃ formation is generally higher in spring and summer and lower in the winter.

Carbon Monoxide (CO)

CO is generally found in high concentrations only near a significant source of emissions (i.e., freeway, busy intersection, etc.). The highest concentrations of CO occur when low wind speeds and a stable atmosphere trap the pollution emitted at or near ground level. These conditions occur frequently in the wintertime late in the afternoon, persist during the night and may extend one or two hours after sunrise. Since mobile sources (motor vehicles) are the main cause of CO, ambient concentrations of CO are highly dependent on motor vehicle activity. In fact, peak CO concentrations occur during rush hour traffic in the morning and afternoon. CO concentrations throughout California have declined significantly due to two statewide programs: (1) the 1992 wintertime oxygenated gasoline program, and (2) Phases I and II of the reformulated gasoline program. Additionally, overall vehicle fleet turnover from higher-emitting older engines to lower-emitting new engines is a significant factor in the declining CO levels.

Sulfur Dioxide (SO₂)

SO₂ is typically emitted as a result of the combustion of a fuel containing sulfur. Fuels such as natural gas contain very little sulfur and consequently have very low SO₂ emissions when combusted. By contrast, fuels high in sulfur content, such as coal or heavy fuel oils, can emit very large amounts of SO₂ when combusted. However, SO₂ emissions from the combustion of fuel oil have been drastically reduced since the introduction of ultra-low sulfur fuel oil (15 parts per million [ppm]) several years ago, which has 99.7% less sulfur content than historic high sulfur fuel oil (5,000 ppm). Sources of SO₂ emissions come from every economic sector and include a wide variety of fuels in gaseous, liquid, and solid form.

Nitrogen Dioxide (NO₂)

The majority of NO_x emitted from combustion sources is in the form of nitric oxide (NO), while the balance is mainly NO₂. NO is oxidized by oxygen (O₂) in the atmosphere to NO₂, but some level of photochemical activity is needed for this conversion. This is why the highest concentrations of NO₂ generally occur during the fall and not in the winter, when atmospheric conditions favor the trapping of ground level releases of NO but lack significant radiation intensity (less sunlight) to oxidize NO to NO₂. In the summer, the conversion rates of NO to NO₂ are high, but the relatively high temperatures and windy conditions (atmospheric unstable conditions) disperse pollutants, reducing the accumulation of NO₂ levels. NO is also oxidized by O₃ to form NO₂. The formation of NO₂ in the summer, with the help of O₃, occurs according to the following reaction:



In urban areas, daytime O₃ concentrations are typically high. These levels drop substantially at night as the above reaction takes place between O₃ and NO. This reaction explains why, in urban areas, O₃ concentrations at ground level drop after dark, while aloft and in downwind rural areas (without sources of fresh NO_x emissions) O₃ concentrations can remain relatively high.

Lead

Lead is a metal found naturally in the environment, as well as in manufactured products. The major sources of lead emissions historically were from fuels in on-road motor vehicles and industrial sources. After lead was removed from on-road motor vehicle gasoline, emissions of lead from the transportation sector dramatically declined by 95 percent between 1980 and 1999. Levels of lead in the

air decreased by 94 percent between 1980 and 1999. Today, the highest levels of lead in air are usually found near lead smelters. The major sources of lead emissions to the air today are ore and metals processing, and piston-engine aircraft operating on leaded aviation gasoline.

Climate Change and Greenhouse Gases

Climate change refers to any significant change in the measures of climate lasting for an extended period of time. In other words, climate change includes major changes in temperature, precipitation, or wind patterns, among other effects, that occur over several decades or longer.

Gases that trap heat in the atmosphere are called greenhouse gases (GHG). Global temperatures are moderated by naturally occurring atmospheric gases, including water vapor, carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O). These gases allow solar radiation (sunlight) into the Earth's atmosphere, but prevent radiative heat from escaping, thus warming the Earth's atmosphere. GHGs are emitted by both natural processes and human activities. In terms of air quality, federal and state regulations and guidelines define GHGs as any of the following compounds: CO₂, CH₄, N₂O, hydrofluorocarbons (HFC), perfluorocarbons (PFC) and sulfur hexafluoride (SF₆). These GHGs can remain in the atmosphere for different amounts of time, ranging from a few years to thousands of years. All of these gases remain in the atmosphere long enough to become well mixed, meaning that the amount that is measured in the atmosphere is roughly the same all over the world, regardless of the source of the emissions.

For each GHG, a Global Warming Potential (GWP) has been calculated to reflect how long it remains in the atmosphere, on average, and how strongly it absorbs energy. The GWP is the potential of a gas or aerosol to trap heat in the atmosphere. Gases with a higher GWP absorb more energy, per pound, than gases with a lower GWP, and thus contribute more to warming Earth. The reference gas for GWP is CO₂, which has a GWP of 1. CH₄ has a GWP of 28 and N₂O has a GWP of 265, these GHGs are the most common resulting from human activity. CO₂, CH₄ and N₂O are products of combustion and are generated from both stationary and mobile combustion sources. HFCs and PFCs are high global warming potential gases that are used in refrigeration and cooling systems. SF₆ is commonly used in magnesium processing and semiconductor manufacturing, as a tracer gas for leak detection, and in electrical transmission equipment, including circuit breakers. The GWP of SF₆ is 22,800.

Currently, there are no formally adopted or published NEPA thresholds for GHG emissions. On December 18, 2014, the CEQ released revised draft guidance on addressing climate change in NEPA documents. The revised draft guidance recommends that agencies consider 25,000 metric tons of carbon dioxide equivalent (CO_{2e}) emissions on an annual basis as a reference point below which a quantitative analysis of greenhouse gas is not recommended unless it is easily accomplished based on available tools and data.

Annual CO₂ emissions from vehicle usage can be calculated using EPA's average carbon content values for fuel. These values are 8,887 grams CO₂ per gallon gasoline and 10,180 grams CO₂ per gallon diesel. EPA estimates an average fuel economy of 21.6 miles per gallon, and annual vehicle travel of 11,400 miles, which equates to 4.7 metric tons of CO₂. EPA further estimates, on average, CO₂ emissions are 95-99% of the total GHG emissions from a passenger vehicle, after accounting for the GWP of all GHGs. The remaining 1-5% is CH₄ and N₂O from the tailpipe, and HFC emissions from leaking air conditioners.

3.6.2 Environmental Consequences

In summary, and as discussed in Section 3.6.1 and quantitated in Tables 3.6-1 and 3.6-2, impacts to air quality are considered significant if implementation of the ICRMP would directly or indirectly:

- expose people to air pollutant concentrations that violate state or federal ambient air quality standards;
- cause a net increase in pollutant emissions that exceed emission significance thresholds;
- conflict with adopted air quality management plan policies or programs; or
- exceed Federal or California greenhouse gas limit regulations.

Proposed Action

Implementation of the ICRMP is not anticipated to result in significant impacts to air quality. Certain projects implemented as part of adhering to the ICRMP could require the use of vehicles and equipment that would be considered air pollution sources. However, these sources would be considered mobile sources, or possibly minor sources. Pollution levels caused by these activities would be negligible when compared to current levels, and GHG emissions are anticipated to be below 25,000 metric tons, and thus not require a quantitative GHG analysis. Additionally, mobile sources, such as vehicles, are not regulated as point sources; and MDAQMD does not require a permit for use of vehicles and transportation equipment. If fugitive dust has the potential to occur due to individual projects undertaken as part of the ICRMP, BMPs outlined in Section 3.12 will be implemented to minimize impacts.

No Action Alternative

No significant impacts to air quality are expected under the No Action Alternative since no new activities would occur.

3.7 Noise

This section describes the affected environment and environmental consequences for noise in the ROI. The ROI for noise that could potentially be affected by the Proposed Action occurs within Fort Irwin boundaries.

Noise is often defined as sound that is loud, unpleasant, undesired, or unexpected. Noise is a subjective response to different types of sounds, and its perception varies widely from person to person. Although exposure to very high noise levels can cause hearing loss, the principal human response to noise is annoyance.

The human ear is not uniformly sensitive to all sound frequencies; therefore, the A-weighting scale has been devised to correspond with the human ear's sensitivity. The A-weighting scale uses the specific weighting of sound pressure levels from about 31.5 hertz to 16 kilohertz for determining the human response to sound. Sound pressure level units are given in decibels; when an A-weighted scale is used, the unit is noted as dB(A).

The decibel scale is not linear, but logarithmic. Therefore, two sound levels that are 10 dB apart differ in acoustic energy by a factor of 10. On the A-weighted scale, an increase or decrease of 10 dB(A) is perceived as twice as loud or half as loud, respectively. For example, 65 dB(A) is twice as loud as 55 dB(A), and half as loud as 75 dB(A).

In the A-weighted scale outside of laboratory conditions, a change of 1 dB(A) cannot be perceived, a 3 dB(A) change is just perceived, and at least 5 dB(A) are required for a noticeable change to occur. As mentioned above, a 10 dB(A) change is perceived as a doubling of sound. Noise from idling vehicles or stationary equipment typically falls off by approximately 6 dB(A) with each doubling of distance from the source, commonly referred to as the "Rule of 6." Widely distributed noises or busy streets will typically fall off at a lower rate.

3.7.1 Affected Environment

Fort Irwin and the National Training Center (NTC) is located within the 19,600-square-mile restricted airspace area R-2508 Complex, a special-use airspace complex that includes all the airspace and the associated land presently used and managed by Fort Irwin and the NTC, the U.S. Air Force Flight Test Center at Edwards Air Force Base (AFB), and the Naval Air Weapons Station (NAWS) China Lake. The R-2502N and R-2502E Areas of the R-2508 Complex consist almost entirely of the airspace over Fort Irwin and the NTC. Primarily, military operations determine the ambient noise environment within those areas. The NTC military training exercises that contribute noise include army vehicle ground maneuvers, artillery firing, air operations, air-to-ground gunnery firing, and transportation to, from, and within NTC during and after maneuvers. Air operations at the Mojave B Range of NAWS China Lake and aircraft stationed at Edwards AFB also contribute to regional ambient noise (Army, 2011).

According to the 2011 EA prepared for the Integrated Cultural Resources Management Plan (ICRMP), a 2008 U.S. Army Environmental and Occupational Hygiene Laboratory Report indicated noise produced on the installation has minimal impacts due to the size and remote location of the installation. Additionally, the size of the installation allows for the dispersion of noise. The only notable noise impact within the cantonment area mentioned was associated with operation of the hospital helipad (Army, 2011).

Regulatory Requirements

Noise requirements at the installation are established at the federal, Army, state, and local level. Requirements are discussed in the following sections.

Federal Regulatory Setting

In 1974, the EPA established guidelines for noise levels, below which no reason exists to suspect that the general population will be at risk from any of the identified effects of noise. These levels are not standards, criteria, regulations, or goals, but are defined to protect public health and welfare with an adequate margin of safety, and to provide guidelines for implementing noise standards locally. The EPA guidelines include equivalent sound pressure level over 24 hours ($L_{eq}(24) \leq 70$ dB(A) to protect against hearing loss; day-night sound level pressure ($L_{dn} \leq 55$ dB(A) to protect against activity interference and annoyance in residential areas, farms and other outdoor areas where quiet is a basis for use; $L_{eq}(24) \leq 55$ dB(A) to protect against outdoor activity interference where limited time is spent, such as school yards and playgrounds; $L_{dn} \leq 45$ dB(A) to protect against indoor activity interference and annoyance in residences; and $L_{eq}(24) \leq 45$ dB(A) to protect against indoor activity interference in schools.

The federal government passed various general laws to regulate and limit noise levels; some of these include the Noise Pollution and Abatement Act of 1970, the Noise Control Act of 1972, and the Quiet Communities Act of 1978. In 1981, the Administration concluded that noise issues were best handled at the state or local government level. As a result, the EPA phased out the Office of Noise Abatement and Control (ONAC) funding in 1982 as part of a shift in the federal noise control policy to transfer the primary responsibility of regulating noise to state and local governments. However, the Noise Control Act of 1972 and the Quiet Communities Act of 1978 were not rescinded by Congress and remain in effect today. The Noise Pollution and Abatement Act of 1970 established the ONAC within the EPA which was authorized to conduct a full and complete investigation of noise and its effect on public health and welfare. The investigation was to include an identification of noise sources, projected noise levels, and effects of noise on persons, animals, and property. The Noise Control Act of 1972 was the first comprehensive statement of national noise policy. It declares, "It is the policy of the U.S. to promote an environment for all Americans free from noise that jeopardizes their health or welfare."

The Noise Control Act was amended by the Quiet Communities Act of 1978 to promote the development of effective state and local noise control programs, to provide funds for noise research, and to produce and disseminate educational materials to the public on the harmful effects of noise and ways to effectively control it. Various agencies have since developed their own noise control programs, with each agency setting its own criteria.

Army Regulatory Setting

The goals of the Environmental Noise Management Program (Army Regulation (AR) 200-1, Chapter 14) are to:

- Control environmental noise to protect the health and welfare of people, on- and off-post, impacted by Army-produced noise, including on- and off-post noise sources.
- Reduce community annoyance from environmental noise to the extent feasible, consistent with Army training and material-testing activities.

- Actively engage local communities in land use planning in areas subject to high levels of operational noise and a high potential for noise complaints.

Army environmental noise policies are based on land use compatibilities as indicated by objective noise levels. A number of noise measurements are used to assess compatibility including the following:

- dB (decibel). A measurement of the sound pressure level.
- dB(A). A-weighted sound pressure level. Sound pressure level, in decibels, as measured on a sound level meter using an A-weighting filter network. The A-weighting filter deemphasizes the very low and very high frequency components of the sound, placing greater emphasis on those frequencies within the sensitive range of the human ear.
- dB(C). C-weighted sound pressure level. Sound pressure level, in decibels, as measured on a sound level meter using a C-weighting filter network. The C-weighting filter emphasizes the very low frequency components of the sound.
- ADNL. A-weighted day-night level. Average A-weighted day-night noise level.
- CDNL. C-weighted day-night level. Average C-weighted day-night noise level.
- SEL. Sound exposure level.

With the exception of small arms, the day-night level (DNL or L_{dn}) is the primary descriptor for military noise. The DNL is the time weighted energy average sound level with a 10 dB penalty added to the nighttime levels. Nighttime is generally defined as 10 p.m. to 7 a.m.

Noise generated by transportation sources (such as vehicles and aircraft) and from continuous sources (such as generators) is assessed using ADNL. Impulsive noise resulting from armor, artillery, and demolition activities is assessed using CDNL. Noise from small arms ranges are assessed using the peak unweighted sound level or the A-weighted SEL. The land use planning zone (LUPZ) is a contour that is used to account for days of higher than average operations. Noise sensitive land uses, such as housing, schools, and medical facilities, are compatible with the noise environment in the LUPZ and noise Zone I, normally incompatible in Zone II, and incompatible in Zone III. Noise limits for noise zones are presented in Table 3.7-1.

Table 3.7-1: Noise Limits for Noise Zones

Noise Zone	Noise Limits (dB)		
	Aviation ADNL	Impulsive CDNL	Small Arms – PK 15(met)
LUPZ	60 – 65	57 – 62	NA
I	<65	<62	<87
II	65 – 75	62 – 70	87 – 104
III	>75	>70	>104

Source: Army, 2007

Notes:

- ADNL A-weighted day-night level
- CDNL C-weighted day-night level
- dB decibel
- LUPZ Land use planning zone
- NA Not applicable
- PK 15(met) Single event peak level exceeded by 15 percent of events
- < Less than
- > Greater than

According to AR 95-1, Aviation Flight Regulations, Chapter 2-15:

- Noise abatement policies will be disseminated by the Commander, U.S. Army Aeronautical Services Agency. Installations will develop and publish local noise abatement programs that minimize the aircraft noise footprint on and near the installation and within the local flying area and establish good public relations programs to educate and inform the public.
- Aviators will participate in noise abatement and fly neighborly programs to minimize annoyance to persons on the ground when missions and safety are not adversely affected.

AR 210-20, Real Property for Master Planning Army Installations, instructs that sustainable design and development are necessary for installation master plans. To that end, the facility will minimize negative impacts on the site and on neighboring properties and structures; and additionally will avoid or mitigate excessive noise.

San Bernardino County Regulatory Setting

According to the San Bernardino County General Plan, the county regulates noise from sources that are not pre-empted by state or federal jurisdiction. Sources include project construction activities; stationary sources, such as fans, pumps, compressors or other mechanical equipment; or mobile sources operating on private property. Section 83.01.080 of the County's Development Code sets forth performance standards for affected (receiving) land uses from stationary and mobile sources, during daytime (7 am to 10 pm) and nighttime (10 pm to 7 am) periods. Exemptions from these standards include motor vehicles not under the control of the industrial use, emergency equipment, vehicles and devices, and temporary construction and repair or demolition activities taking place between the hours of 7 a.m. and 7 p.m. Monday through Saturday, excluding federal holidays (SBC, 2015b).

Section 83.01.080 establishes standards concerning acceptable noise levels for both noise-sensitive land uses and for noise-generating land uses. Table 3.7-2 describes the noise standard for emanations from a stationary noise source, as it affects adjacent properties. Noise from mobile sources may affect adjacent properties adversely; therefore, noise standards for adjacent mobile noise sources have also been established and are presented in Table 3.7-3.

Table 3.7-2: Noise Standards for Stationary Noise Sources

Noise Standards for Stationary Noise Sources		
Affected Land Uses (Receiving Noise)	7 am – 10 pm (L_{eq})	10 pm – 7 am (L_{eq})
Residential	55 dB(A)	45 dB(A)
Professional Services	55 dB(A)	55 dB(A)
Other Commercial	60 dB(A)	60 dB(A)
Industrial	70 dB(A)	70 dB(A)
L _{eq} = (Equivalent Energy Level). The sound level corresponding to a steady-state sound level containing the same total energy as a time varying signal over a given sample period, typically 1, 8 or 24 hours.		
dB(A) = (A-weighted Sound Pressure Level). The sound pressure level, in decibels, as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound, placing greater emphasis on those frequencies within the sensitivity range of the human ear.		
L _{dn} = (Day-Night Noise Level). The average equivalent A-weighted sound level during a 24-hour day obtained by adding 10 decibels to the hourly noise levels measured during the night (from 10 pm to 7 am). In this way L _{dn} takes into account the lower tolerance of people for noise during nighttime periods.		

Source: San Bernardino County Code (SBC, 2015a)

The San Bernardino County Code further established noise limit categories and states the following: “Noise limit categories. No person shall operate or cause to be operated a source of sound at a location or allow the creation of noise on property owned, leased, occupied, or otherwise controlled by the person, which causes the noise level, when measured on another property, either incorporated or unincorporated, to exceed any one of the following:

The noise standard for the receiving land use as specified in Subsection B (Noise-impacted areas), above, for a cumulative period of more than 30 minutes in any hour.

- A. The noise standard plus 5 dB(A) for a cumulative period of more than 15 minutes in any hour.
- B. The noise standard plus 10 dB(A) for a cumulative period of more than five minutes in any hour.
- C. The noise standard plus 15 dB(A) for a cumulative period of more than one minute in any hour.
- D. The noise standard plus 20 dB(A) for any period of time.”

Table 3.7-3: Noise Standards for Adjacent Mobile Noise Sources
Noise Standards for Adjacent Mobile Noise Sources

Land Use		L _{dn} (or CNEL) dB(A)	
Categories	Uses	Interior ¹	Exterior ²
Residential	Single and multi-family, duplex, mobile homes	45	60 ³
Commercial	Hotel, motel, transient housing	45	60 ³
	Commercial retail, bank, restaurant	50	NA
	Office building, research and development, professional offices	45	65
	Amphitheater, concert hall, auditorium, movie theater	45	NA
Institutional/Public	Hospital, nursing home, school classroom, religious institution, library	45	65
Open Space	Park	NA	65
Notes: (1) The indoor environment shall exclude bathrooms, kitchens, toilets, closets and corridors. (2) The outdoor environment shall be limited to: <ul style="list-style-type: none"> ■ Hospital/office building patios ■ Hotel and motel recreation areas ■ Mobile home parks ■ Multi-family private patios or balconies ■ Park picnic areas ■ Private yard of single-family dwellings ■ School playgrounds (3) An exterior noise level of up to 65 dB(A) (or CNEL) shall be allowed provided exterior noise levels have been substantially mitigated through a reasonable application of the best available noise reduction technology, and interior noise exposure does not exceed 45 dB(A) (or CNEL) with windows and doors closed. Requiring that windows and doors remain closed to achieve an acceptable interior noise level shall necessitate the use of air conditioning or mechanical ventilation. CNEL = (Community Noise Equivalent Level). The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of approximately five decibels to sound levels in the evening from 7 p.m. to 10 p.m. and 10 decibels to sound levels in the night from 10 p.m. to 7 a.m.			

Source: San Bernardino County Code (SBC, 2015a)

Sensitive Receptors

Noise-sensitive receptors exist at Fort Irwin and include schools, day care facilities, medical facilities, and residences. Most of the on-installation housing units for military personnel are located in the western section of the cantonment area, bounded by North Loop Road, Outer Loop Road, Inner Loop Road, and Barstow Road.

3.7.2 Environmental Consequences

Environmental noise is often non-steady, but there are some exceptions. For example, noise from air-conditioners is relatively steady. A fluctuating noise has its magnitude varying quite considerably over time. Examples are road traffic noise, rock music, and noise from a train passing by. For an impulsive noise, the level rises sharply and then falls rapidly. Examples include hammering, shooting, or blasting noise. Because the decibel scale is logarithmic and not additive, additional traffic noise will not necessarily result in a perceptible sound increase.

Proposed Action

Implementation of the ICRMP is not anticipated to result in significant noise producing activity. Certain projects implemented as part of adhering to the ICRMP could require the use of vehicles and equipment that would be considered minor noise sources. Noise levels caused by these activities would be negligible when compared to current levels caused by use of other local vehicles.

No Action Alternative

No significant noise impacts are expected under the No Action Alternative since no new noise generating activities would occur.

3.8 Cultural Resources

Cultural resources include cultural landscapes, ethnographic resources, historic places, properties of traditional and cultural importance, artifacts and documents, buildings, structures, sites, districts, and objects. This section describes the affected environment and environmental consequences for cultural resources within the ROI.

3.8.1 Affected Environment

The ROI for cultural resources that could potentially be affected by the Proposed Action occurs within Fort Irwin boundaries.

Regulatory Requirements

This section discusses the primary laws regulating preservation of cultural resources. It also addresses the laws and regulations that protect the interest of Native Americans. Fort Irwin NTC is required to consult with Native Americans regarding Army activities on sites within the installation. The National Historic Preservation Act of 1966, as amended, (NHPA) requires federal agencies to consult with the Advisory Council on Historic Preservation (ACHP) regarding proposed actions that have the potential to affect a property on or eligible for the National Register of Historic Places (NRHP). This includes consultation with the State Historic Preservation Office (SHPO) and interested parties, including but not limited to Native Americans.

Federal, State, and Native American Requirements

The Antiquities Act of 1906 as amended (PL 59-209; 34 Stat. 225; 16 USC 431-433) is the earliest and most basic legislation for protecting cultural resources on Federal lands. It provides misdemeanor-level criminal penalties to control unauthorized uses. Appropriate scientific uses may be authorized through permits, and materials removed under a permit must be permanently preserved in a public museum. The 1906 Act is broader in scope than the 1979 Archaeological Resources Protection Act (ARPA), which partially supersedes it. Uniform regulations at 43CFR Part 3 implement the Act.

The Archaeological and Historic Preservation Act of 1974 amended the Reservoir Salvage Act of 1960 (PL 86-523; 74 Stat. 220, 221; 16 USC 469; PL 93-291; 88 Stat. 174; 16 USC 469) and provides for the preservation of historical and archaeological data that might otherwise be lost as the result of Federal construction projects or Federally-licensed or assisted programs. The act provides that up to one percent of congressionally authorized funds for a project may be spent from appropriated project funds to recover, preserve, and protect archaeological and historical data.

The Historic Sites Act of 1935 as amended (PL 74-292; 49 Stat. 666; 16 USC 461) declares national policy to identify and preserve nationally significant "historic sites, buildings, objects and antiquities." It authorizes the National Historic Landmarks program and provides the foundation for the NRHP authorized in the NHPA. Regulations implementing the National Historic Landmarks Program are at 36 Code of Federal Regulations (CFR) Part 65.

The National Environmental Policy Act of 1969 as amended (42 USC 4321, and 4331 - 4335) states it is the Federal government's continuing responsibility to use all practicable means to preserve important

historic, cultural, and natural aspects of our national heritage. It also instructs Federal agencies to prepare environmental impact statements for each major Federal action having an effect on the environment. The NHPA requires federal agencies to evaluate the effects of their activities and programs on eligible cultural resources. The NHPA established the ACHP to administer the preservation review process established by Section 106. The act requires federal agencies to take into account any action that may adversely affect any structure or object that is, or can be, included in the NRHP. The regulations, codified at 36 CFR 60.4, provide criteria to determine if a site is eligible. In addition, the regulations define how those properties or sites are to be dealt with by federal agencies or other involved parties. The regulations apply to all federal undertakings and all cultural resources.

The NHPA implemented two amendments that have a direct bearing on the Section 106 review process. The first is Section 101(d)(6)(A) which, clarifies that historic properties of religious and cultural significance to federally recognized tribes and other Native Americans may be eligible for listing in the NRHP. Section 101(d)(6)(B) requires Federal agencies, to carry out their Section 106 responsibilities, and consult with any federally recognized tribe that attaches religious and cultural significance to historic properties that may be affected by an undertaking.

To comply with Section 106 regulations regarding Tribal Coordination, the ICRMP establishes procedures to identify and notify potential stakeholders of undertakings that trigger the NHPA and could affect interested parties. Native Americans and other interested parties that might attach religious and/or cultural significance to historic properties in the area of potential impact of an undertaking are to be involved in the planning process under procedures established in the ICRMP.

Consultation, on the ICRMP, with the federally recognized Native American tribes affiliated with Fort Irwin is currently ongoing.

The purpose of the ARPA is to secure the protection of archaeological resources and sites that are on public lands and Indian lands and to foster increased cooperation and exchange of information between governmental authorities, the professional archaeological community, and private individuals having collections of archaeological resources.

The ARPA requires that archaeological resources on public and Indian lands be protected. This includes notifying Indian tribes, in advance, of possible harm to sites with religious or cultural importance. The Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) protects the ownership and control of Native American human remains and related cultural items excavated or discovered on federal lands. If human remains are discovered during projects, work must stop, and a reasonable effort must be made to protect the discovery. Appropriate Native American groups must be notified, and requirements of Section 106 of NHPA and NAGPRA must be followed for excavation and disposition of the remains.

The American Indian Religious Freedom Act of 1978 (AIRFA), as amended, was passed to protect and preserve for American Indians their inherent right to freedom to believe, express, and exercise the traditional religions of the American Indian, Eskimo, Aleut, and Native Hawaiians, including but not limited to access to sites, uses and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites.

Executive Order 13007 (Indian Sacred Sites) stipulates that if a federally recognized tribe or representative of an Indian religion identifies a sacred site on Fort Irwin, the installation commander must

enter into consultation with that group or individual to provide access to and ceremonial use of the site and avoid adversely affecting the physical integrity of such sites.

Department of Defense and Army Regulations and Guidance

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

DoDI 4715.16 Cultural Resources Management, implements policy, assigns responsibilities, and prescribes procedures for the integrated management of cultural resources on property under DoD control. AR 200-1 implements federal, state, and local environmental laws and DoD policies for preserving, conserving, and restoring the environment.

Army Regulation (AR) 200-1 and DoDI 4715.16 provide for the preparation of an ICRMP for military installations. The Cultural Resources Manager is the individual responsible for the day-to-day management of cultural resources at Fort Irwin. The Installation Management Command directs and assists its installations in the conduct of installation cultural resources programs consistent with AR 200-1. The Garrison Commander has direct responsibility for establishing an installation cultural resources management program by means of an ICRMP that successfully integrates cultural resources management within the process of achieving daily mission objectives.

The five-year ICRMP is a component of the installation master plan and is the Garrison Commander's summary for cultural resources management decisions, actions and specific cultural resources compliance procedures. For a complete list of cultural resource management regulations see Appendix B of the Fort Irwin 2016 – 2020 ICRMP.

Cultural Resources

Cultural resources are defined as cultural landscapes, ethnographic resources, historic places, properties of traditional and cultural importance, artifacts and documents, buildings, structures, sites, districts, and objects. The term cultural resource can apply to those parts of the physical environment, natural or built that have cultural value of some kind to a sociocultural group. This can include spiritual places, cultural landscapes, ethnographic resources, historic places, and Native American cultural items, which have properties of traditional and cultural importance (referred to by the National Park Service as Traditional Cultural Properties). Significant cultural resources, defined as Historic Properties (36 CFR 800.16(l)), are those that are listed in or eligible for listing in the NRHP.

Currently there is one archaeological site, the Kit Carson Redoubt at Bitter Springs, and one structure, the National Aeronautics and Space Administration (NASA) Pioneer antenna in the GDSCC listed as a National Historic Landmark in 1985, listed on the NRHP at Fort Irwin. To date no Traditional Cultural Properties have been identified at Fort Irwin (Army, 2016).

Cultural resource inventories are conducted on Fort Irwin on a case-by-case basis depending on training needs. As a result, the majority of survey work conducted within the Fort Irwin boundary has been within active training areas (Figure 3.8-1). These areas are primarily situated within basins and areas of moderate to low topographic relief (CALIBRE, 2005). The installation encompasses approximately 753,537 acres. Of this approximately 301,263 acres, or 40 percent, has been surveyed for cultural

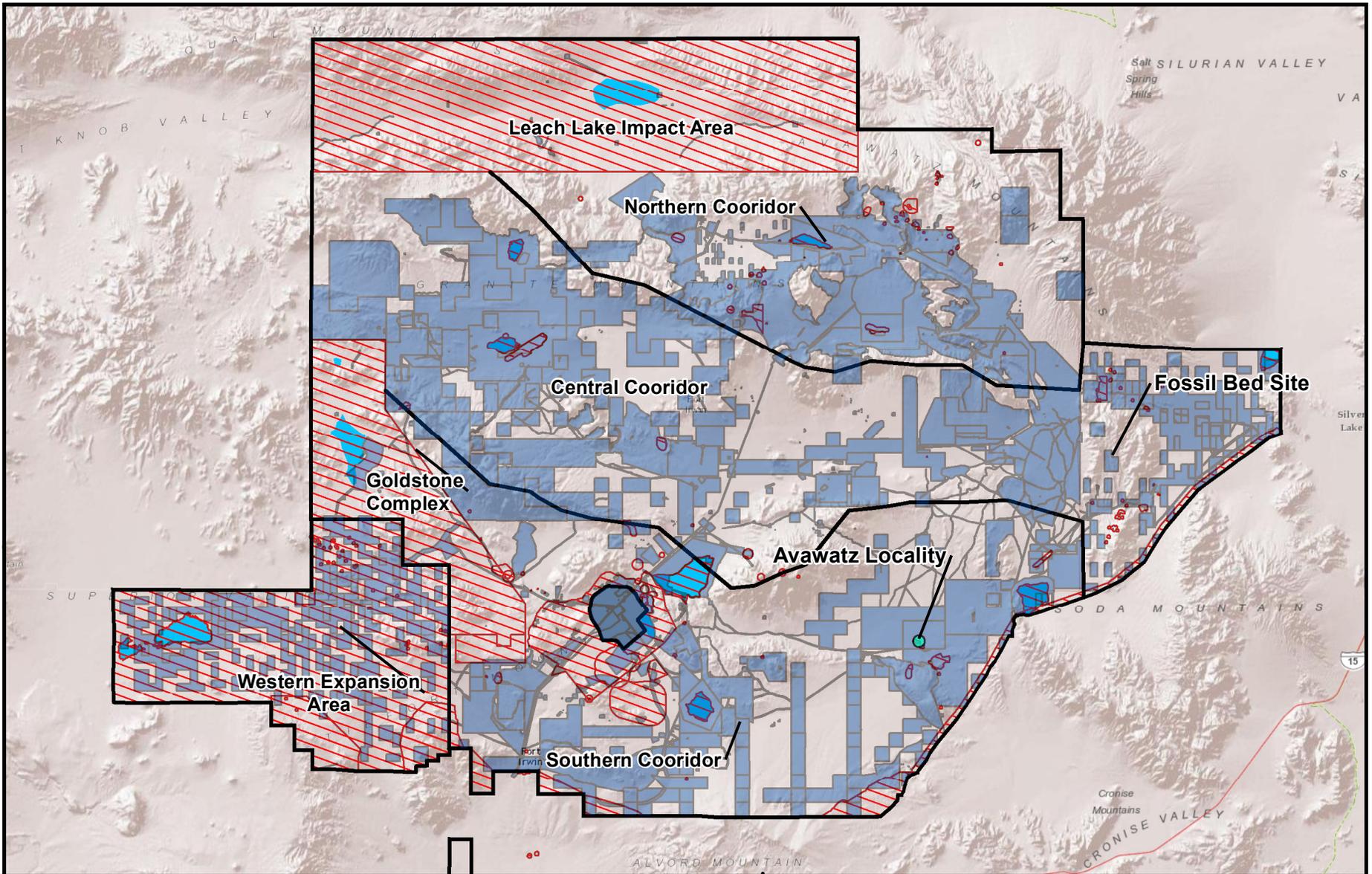
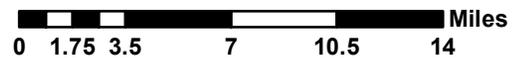


Figure 3.8-1
Archaeological and Paleontological Resources Data
Fort Irwin EA/ICRMP

SCALE: 1 in = 6 miles DATE DRAWN: MAY 25, 2016



Legend

- | | |
|---|--|
|  Cultural Survey |  Cantonment |
|  Installation Boundary |  Off Limit Area |
|  Dry Lakes and Playas | |

resources. Portions of Fort Irwin have traditionally been off limits to cultural resource studies including the Leach Lake Gunnery Range. The Leach Lake Gunnery Range includes 91,330 acres that have not been subject to cultural resource inventories. Slopes greater than 20 percent are avoided for vehicle maneuver training and total 180,526 acres with 21 percent having been surveyed (38,438 acres). Excluded from vehicle maneuver training are 412,417 acres (the 231,891 acres of off limits areas and the 180,526 acres of areas with slopes exceeding 20 percent). This leaves only 351,060 acres available for vehicle maneuver training with 62.1 percent of that acreage (217,866) having been inventoried for cultural resources.

Native American tribes affiliated with the lands of Fort Irwin may have traditional associations with certain archaeological remains, landforms, springs, trails, and/or native plants on the installation. Fort Irwin consults with federally recognized tribes and other cultural groups with interests in installation lands in efforts to identify such properties when conducting cultural resource inventories. Although no properties of traditional cultural importance have been identified on the installation to date, certain general locations of resources or places of concern to tribes were identified as part of a study and conference conducted in 2002 with federally recognized tribes affiliated with lands of Fort Irwin.

3.8.2 Environmental Consequences

Impacts to cultural resources are considered significant if historic properties, that are eligible for the NRHP, are destroyed, altered, or moved, or if their historical setting is altered.

Proposed Action

Implementation of the ICRMP is expected to have a minor, indirect, and long-term positive impact on cultural resources. The ICRMP identifies requirements for the protection of cultural resources by providing SOPs designed to help avoid impacts to cultural resources, including appropriate mitigation measures to avoid adverse effects to cultural resources. The ICRMP SOPs are essentially BMPs. Some of these BMPs such as constructing fences, vehicle barriers and restrictions against training in certain areas are outlined in Section 3.12. The ICRMP provides the goals, processes for meeting these goals, and reporting requirements for monitoring the success of the program. This includes cultural resources preservation requirements briefings prior to each training rotation. This has a positive impact as it raises the awareness of military units using training areas and minimizes potential future impacts to cultural resources. By identifying and protecting cultural resources and by educating users, damage that can lead to violations and interrupt training will be avoided, and will allow military units to concentrate on training. Implementation of the ICRMP ensures that various public consultation requirements are met including government-to-government consultation with tribes. The ICRMP SOPs outline the consultation requirements with Native American Tribes associated with Fort Irwin lands.

No Action Alternative

The No Action Alternative would not result in significant impacts to cultural resources. However, under the No Action Alternative, the ICRMP and cultural resources management activities that protect cultural resources would not be implemented. DoDI 4715.16 and AR 200-1 require each installation to prepare and implement an ICRMP. Without proper management, cultural resources may be negatively affected, which could subsequently impact Fort Irwin and the NTC's military training mission.

3.9 Paleontological Resources

Paleontological resources include assemblages of fossils that are unique, unusual, rare, uncommon, or diagnostically or stratigraphically important. This section describes the affected environment and environmental consequences for paleontological resources within the ROI.

3.9.1 Affected Environment

The ROI for paleontological resources that could potentially be affected by the Proposed Action occurs within Fort Irwin boundaries.

Regulatory Requirements

Some of the regulations that obligate federal agencies to protect and manage cultural resources cross over to paleontological resources. However, a number of laws address paleontology at least partially. For example, the Archaeological Resource Protection Act (ARPA) of 1979 (16 USC 470ee) prohibits the unauthorized removal of fossils that are in an archaeological context and the Federal Cave Resources Act of 1988 (16 U.S.C. 4306) prohibits the removal of paleontological resources from a designated significant cave without authorization. Other laws that protect paleontological resources include: The National Environmental Policy Act of 1969, as amended (Pub. L. 91-190, 42 U.S.C. 4321-4347, January 1, 1970, as amended by Pub. L. 94-52, July 3, 1975, Pub. L. 94-83, August 9, 1975, and Pub. L. 97-258 § 4(b), Sept. 13, 1982), recognizes the continuing responsibility of the Federal Government to “preserve important historic, cultural, and natural aspects of our national heritage.” (Sec. 101 [42 USC § 4321]) (#382).

Federal Land Management and Policy Act of 1976 (43 U.S.C. 1712[c], 1732[b]); sec. 2, Federal Land Management and Policy Act of 1962 [30 U.S.C. 611]; Subpart 3631.0 et seq.), Federal Register Vol. 47, No. 159, 1982. Defines significant fossils as: unique, rare or particularly well-preserved; an unusual assemblage of common fossils; being of high scientific interest; or providing important new data concerning [1] evolutionary trends, [2] development of biological communities, [3] interaction between or among organisms, [4] unusual or spectacular circumstances in the history of life, [5] or anatomical structure.

Paleontological Resources Preservation, Omnibus Public Lands Act, Public Law 111-011, Title VI, Subtitle D (OPLA-PRP, 2009). This legislation directs the Secretaries (Interior and Agriculture) to manage and protect paleontological resources on federal land using “scientific principles and expertise.” OPLA-PRP incorporates most of the recommendations of the report of the Secretary of the Interior entitled Assessment of Fossil Management on Federal and Indian Lands (2000) in order to formulate a consistent paleontological resources management framework. In passing the OPLA-PRP, Congress officially recognized the scientific importance of paleontological resources on some federal lands by declaring that fossils from these lands are federal property that must be preserved and protected.

Paleontological Resources

Paleontological resources are assemblages of fossils that are unique, unusual, rare, uncommon, or diagnostically or stratigraphically important. Fossils are remains of prehistoric animal and plant life and

are nonrenewable resources of scientific and educational value that contribute important information to our understanding of evolutionary history.

Paleontological studies conducted on the installation have identified two fossil bearing localities in addition to fossil-bearing formations and potential sensitive fossiliferous areas. Fort Irwin hosts several known paleontological locales including important fossils and trackways predating human presence in what is now the Mojave Desert. Robert E. Reynolds of San Bernardino County Museum identified and mapped paleontological sensitive areas of the Mojave Desert containing ancient mammal footprints and trackways. Collections from Fort Irwin are housed at the Raymond M. Alf Museum of Paleontology and the Webb School in Claremont, California.

Excavations conducted on Fort Irwin recovered 8,332 specimens from 24 different taxa of plant and animals. This included the remains of tortoise, large camel, small and large horse, mammoth, dire wolf, shortfaced bears, coyotes, rabbits, rats, and mice. Recovered remains include vertebrate fossil specimens from the Rancholabrean land mammal age dating from circa 700,000 years before present (ybp) to 10,000 ybp. The fossils appear to have accumulated by deflation of original matrix onto coarse sands. This collection is housed at the San Bernardino County Museum Earth Science Department in the City of San Bernardino, California.

The paleontological data from the Regional Paleontological Localities Inventory provided by R.E. Reynolds at the San Bernardino County Museum was combined with Calzia and Troxel's 1997 examination of the geology and paleontological resources potential within the Silurian Valley, which is located approximately 42 miles northeast of Fort Irwin. Based on the fossil content and depositional environment in this area, rocks were classified as having high, low, or no paleontological resources potential (CALIBRE, 2005).

Various areas within Fort Irwin have the potential to contain vertebrate and invertebrate fossils. Areas determined to have High Potential contain rock units in which vertebrate or significant invertebrate fossils have been determined by previous studies to be present or likely to be present. The High Potential classification is further broken down into two categories: A and B. The sensitivity of paleontological resources in High A is based on formations or mappable rock units that are known to contain, or have the correct age and depositional conditions to contain, significant paleontological resources, whereas the sensitivity in High B is based on topography, mountain mass, and rock type. Areas that were classified as Low Potential were determined by a qualified vertebrate paleontologist, following a literature and records search and a field survey. Areas in which literature and unpublished studies were not available are classified as having Undetermined Potential. A large portion of Fort Irwin has been classified as Low Potential. Smaller areas at various locations throughout Fort Irwin have been classified as High Potential. Fort Irwin also contains multiple smaller areas that have Undetermined Potential (CALIBRE, 2005). Several High Potential A and B areas have been identified within or immediately adjacent to Fort Irwin. These areas from north to south include a High (A) and (B) within the Avawatz Mountains area, High (A) areas located east and south of the Eastern Expansion area, north of Bicycle Lake, south and southwest of Red Pass Lake, areas adjacent to Dry Lake and Superior Lake, and areas adjacent to Coyote Lake.

3.9.2 Environmental Consequences

Impacts to paleontological resources are considered significant if fossil-bearing formations are destroyed, altered, or moved, or if sensitive fossiliferous areas are altered.

Proposed Action

Implementation of the ICRMP is expected to have a minor, indirect, and long-term positive impact on paleontological resources. The ICRMP identifies requirements for the protection of paleontological resources by providing SOPs designed to help avoid impacts, including appropriate BMPs and mitigation measures (outlined in Section 3.12) to avoid adverse effects to paleontological resources. The ICRMP provides the goals, processes for meeting these goals, and reporting requirements for monitoring the success of the program. This includes paleontological resources preservation requirements briefings prior to each training rotation. This has a positive impact as it raises the awareness of military units using training areas and minimizes potential future impacts to paleontological resources. By identifying and protecting paleontological resources and by educating users, damage that can lead to violations and interrupt training will be avoided, and will allow military units to concentrate on training.

Implementation of the ICRMP ensures the protection of paleontological resources. The paleontological resources found on Fort Irwin are recognized as constituting a fragile and nonrenewable scientific record of the history of life considered a critical component of America's natural heritage.

No Action Alternative

The No Action Alternative would not result in significant impacts to paleontological resources. However, under the No Action Alternative, the ICRMP and cultural resources management activities that protect paleontological resources would not be implemented. DoDI 4715.16 and AR 200-1 require each installation to prepare and implement an ICRMP. Without proper management, paleontological resources may be negatively affected, which could subsequently impact Fort Irwin and the NTC's military training mission.

3.10 Socioeconomics and Environmental Justice

This section describes the affected environment and environmental consequences for socioeconomic and environmental justice resources in the ROI. Areas discussed include population, housing, economic development, community services, environmental justice, and the protection of children.

3.10.1 Affected Environment

The ROI subject to this analysis is Fort Irwin and the NTC, the City of Barstow, and San Bernardino County. These areas were selected because the most substantial social and economic effects would occur where Fort Irwin employees live and work.

San Bernardino County is located in the southern portion of the State of California and is the largest county in California and the continental United States. The desert and mountain areas of the county extend west from Los Angeles County to Nevada. According to the U.S. Census Bureau, the county covers over 20,000 square miles. The City of Barstow is located north of the San Bernardino Valley and San Bernardino Mountains within the Desert Region of the county. The City of Barstow is located at the cross-routes of Interstates 15 and 40 and is the closest city to Fort Irwin. The City of Barstow has a total land area of 33.6 square miles (ORP, 2008). The mean travel time to Fort Irwin is 45 minutes from the City of Barstow, one hour 40 minutes from Victorville, and 2 hours 36 minutes from the City of San Bernardino.

Regulatory Requirements

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority and Low-Income Populations", was signed in 1994, and requires that Federal agencies address environmental justice in implementing their programs, policies, and activities. The health and environment of minority and low-income populations should not be disproportionately impacted by any Federal agency (FR Vol. 59, No. 32, February 16, 1994).

In 1997, Executive Order 13405 (EO 13405), "Protection of Children from Environmental Health and Safety Risks", was signed, requiring that Federal agencies address activities that may disproportionately affect the health of children, who are more vulnerable to environmental health and safety risks (FR Vol. 62, No. 78, April 23, 1997).

Population

California's Department of Finance estimates San Bernardino County's population in 2015 to be over two million (2,104,291), a 22% increase since 2010 (City of San Bernardino, 2015). It is estimated that the population will reach approximately 2.66 million by 2035, assuming a 27% growth rate (SBC, 2015c). The bulk of the county population resides south of the San Bernardino Mountains in the San Bernardino Valley.

According to the 2010-2014 American Community Survey 5-Year Estimates, total population was 23,110 in the City of Barstow and 9,191 in Fort Irwin (Census, 2014). Whereas, the 2010 Census reports the population of Fort Irwin as 8,845, compared to 22,639 in the City of Barstow and 2,035,210 in San Bernardino County (Census, 2010).

The population of Fort Irwin fluctuates regularly due to training rotations, military reassignments and training schedules. However, the population is generally trending upwards. Table 3.10-1 shows a population comparison of San Bernardino County and the City of Barstow for the years 2000, 2010, and 2015.

Table 3.10-1: Estimated Population Comparison of San Bernardino Count and the City of Barstow

Location	2000	2010	2015
San Bernardino County	1,710,139	2,035,210	2,104,291
City of Barstow	21,119	22,639	23,407

Source: City of San Bernardino summary of California Department of Finance population data (San Bernardino, 2015).

As a heavily used training installation for the United States Army, Fort Irwin demographics include 4,448 active duty soldiers, 7,701 family members, a 7,201 person civilian workforce, and an average of 5,629 rotational unit (training) personnel. The installation's daily population varies depending on the size of the training units using Fort Irwin. The current installation's daily population is 24,979 people (Fort Irwin, 2015).

Housing

At the time of the 2010 Census, San Bernardino County contained 699,637 housing units, 611,618 of which were occupied, and 88,019 of which were vacant. Owner-occupied units accounted for 383,573 (Census, 2010). Five-year estimates from 2010-2014 indicate housing units available to be 703,737, with 607,604 occupied and 96,133 vacant. The median value of a home in 2014 was estimated at \$225,400 (Census, 2014). However, the median sale price of a home in 2015 was \$206,660, down 8% from the sale price in 2014. The number of homes sold in 2014 was at an all-time low since 2000, and the County's home ownership rate is currently 60% (SBC, 2015c).

The housing market has been growing in the City of Barstow, while the percentage of owner-occupied units has been decreasing. As of the 2000 Census, the City of Barstow had 9,153 housing units, with owner-occupied units accounting for approximately half. It currently has an estimated 9,459 housing units available with 3,791 units owner-occupied, based on five-year estimates from 2010-2014. An estimated 7,937 units were occupied and 1,522 were vacant. The median value of a home in the City of Barstow was estimated to be \$93,600 (Census, 2014). Affordable housing is available in the City of Barstow, and two new developments, Shadow Ridge and Highland Trails Ranch, will offer higher-end family homes to serve the increasing demand of moderate to upper income residents. Additional growth in the housing market is expected due to recent and planned City annexations, as well as the availability of affordable vacant residential land (WE, 2010).

New housing has been built over the past several years on Fort Irwin, most recently completed in 2012, in addition to renovating older housing units. As of 2008, 2,046 homes were available through Fort Irwin Military Family Housing (State of California, 2008). The Villages at Fort Irwin currently offers 2,468 family homes, as well as 200 Unaccompanied Personnel Housing suites (Villages at Fort Irwin, 2015).

Most of the military and civilian personnel who reside off-post live in the City of Barstow and the adjacent small communities of Lenwood, Hinkley, Yermo, Daggett, and Newberry Springs, or in the communities of Victorville, Hesperia, and Apple Valley (Army, 2011).

Economic Development

The workforce in San Bernardino County is estimated to be 855,700, including 77.9% with a high school degree and 18.5% with a college degree (SBC, 2014). Five industries provide almost half of all jobs in San Bernardino County:

- Healthcare
- Professional/Scientific/Technical Services
- Logistics
- Manufacturing
- Construction/Housing-Related Industries

Since 2001, the Logistics sector has increased by 60% and provided the greatest growth in employment for San Bernardino County. Also experiencing growth, the Healthcare industry provided a 37% increase in employment, while employment in the Professional/Scientific/Technical Service Sectors increased by 33%. Employment in Manufacturing and Construction/Housing-Related Industries decreased between 2001- 2013, but only fluctuated marginally in the past few years (SBC, 2015c).

While unemployment has fluctuated since 2000, it has been steadily decreasing since its high in 2010 of 13.5%, and was only 6.3% in 2015. San Bernardino is one of 58 counties in California and ranks 23rd in unemployment. The county's unemployment rate is nearing the state's unemployment rate after several years of being significantly higher (SBC, 2015c). The estimated median household income from 2010-2014 (in 2014 dollars) is \$54,100, lower than the statewide estimate of \$61,489. The per capita income estimate in the county is also less than the state estimate, \$21,384 versus \$29,906.

Located next to the Calico Mountains and the Mojave River, the City of Barstow has its roots as a mining center for silver and borax. Barstow was named after the Santa Fe Railroad's president William Barstow Strong. The railroad was built in the 1880's to transport mining products from the area, and by the early 1900's, Barstow was growing as a city in the heart of a main transportation hub (ORP, 2008). It grew from a small mining and railroad town to serve as a center for the defense, mining, and tourist retail sectors. There are two outlet store complexes, the Tanger Outlet and the Barstow Outlet Stores, although the Barstow Outlet Stores has only a few stores remaining due to growing vacancies. The city experienced slow economic growth in the 1990s (City of Barstow, 2014). Today, at the intersection of Interstate 15, Interstate 40, and California Highway 58, the City of Barstow remains a key city along a major transportation corridor between Los Angeles and Las Vegas, through which 19 million vehicles travel each year. The City contains a community college offering vocational training, is home to the Marine Corps Logistics Base, and is growing as a central location for logistics, manufacturing, and distribution. It is also the closest city to Fort Irwin and NASA's Goldstone Deep Space Communications Complex (City of Barstow, 2016).

Renewed economic development in the City of Barstow has recently been initiated by the city with the opening of a new community hospital, new residential developments being planned, and the proposed site of three new casinos. In addition to a large amount of retail space available, there are approximately five square miles of land available for development, which already includes an Industrial Park and

Business Park (City of Barstow, 2016). Barstow's median household income estimate from 2010-2014 (in 2014 dollars) was \$40,648 and per capita income was \$18,863 (Census, 2014).

Fort Irwin contributes a considerable portion of the economy in the City of Barstow and the County of San Bernardino. It is the largest employer in the City of Barstow and third largest employer in San Bernardino County. Approximately \$355 million is spent annually by Fort Irwin on payroll and contract expenditures. Fort Irwin administers an estimated 12,000 contracts, worth between \$2,500 and \$75 million each (State of California, 2008). Fort Irwin's median household income from 2010-2014 (in 2014 dollars) was \$49,928 and per capita income was \$19,077, both higher than estimates for the City of Barstow, but lower than San Bernardino County (Census, 2014).

Services

Schools

The Silver Valley Unified School District provides K-12 educational services at Fort Irwin with three elementary schools, two middle schools, and a high school. Fort Irwin offers a preschool, Lewis Elementary School (Grades K-2), Tiefort View Intermediate School (Grades 3-5), and Fort Irwin Middle School (Grades 6-8) located on the installation. Children of high school age who live on Fort Irwin attend Silver Valley High School (SVHS) in Yermo. A total of 1,626 students are served by Fort Irwin. Student enrollment in 2015 for Fort Irwin is listed in Table 3.10-2 below.

Table 3.10-2: School Enrollment for Fort Irwin

School	Number of Students Enrolled
Pre-School	194
Lewis Elementary (K-2)	561
Tiefort View Intermediate (Grades 3-5)	410
Fort Irwin Middle School (Grades 6-8)	293
SVHS Military Dependents	168
Total Fort Irwin Students	1,626

Source: Fort Irwin, August 2015

Fort Irwin also operates a library for its residents and employees.

Police Services

Fort Irwin has a civilian police department to protect residents and employees on the installation. Fort Irwin maintains a cooperative agreement with the San Bernardino County Sheriff.

Fire and Emergency Services

Fort Irwin has one fire department with two fire stations on base and is equipped with emergency medical services. Off-post fire protection services in the region are provided by the Barstow Fire Protection District, which has three fire stations. Fort Irwin maintains a mutual assistance agreement with the Barstow Fire Protection District.

Medical Facilities

The U.S. Army Medical Department provides the Weed Army Community Hospital at Fort Irwin to serve the health needs of eligible military and civilian families. Javier Villanueva Troop Medical Clinic offers behavioral health services.

The U.S. Army Dental Clinic Command runs the Shuttleworth Dental Clinic at Fort Irwin, which provides dental care to eligible military and civilian families.

The Mary E. Walker Clinic is an ambulatory-care clinic that includes outpatient-related administrative functions. Outpatient services include primary care, optometry, audiology, orthopedics, obstetrics and gynecology, mental health, emergency services, preventive medicine, internal medicine, Exceptional Family Member Program, laboratory, pediatrics and well baby care, physical exams, physical therapy, radiology, social work services, and substance abuse and rehabilitation service.

The primary off-post healthcare provider in the area is the Barstow Community Hospital as well as several independent physicians and surgeons, dentists, optometrists, chiropractors, a convalescent home, and an ambulance air service.

Family Support Services

Fort Irwin offers extensive family support services on the installation, including a Child Development Center, counseling services, and child, youth & school services such as before/after school care and recreational camps (U.S. Army Installation Management Command's Family and Morale, Welfare and Recreation Programs). In addition, exceptional family member program support is provided for family members with special needs, the American Red Cross provides Emergency Relief Services, and a Women, Infants, and Children Food program is available.

Recreation Facilities

Memorial Fitness Center offers exercise and recreation activities for Fort Irwin employees and residents. Additional Fort Irwin facilities include a water park, bowling alley, and arts and crafts center.

Environmental Justice

As is the case with Southern California, more than half of the population in San Bernardino County is a minority. Latinos account for 51% of the population, Black or African American for 8%, Asian or Pacific Islander for 7%, White for 31%, and the remaining 2% report more than one race (SBC, 2015). The poverty rate in the county was 19.7% in 2013 and has been on the rise since 2007 when it was 13.7%. If broken out by ethnicity, poverty rates vary significantly; in San Bernardino County, the highest rate of poverty was 25.5% for African American families, followed by 20.8% for Latino families. White families had only 9.2% rate of poverty, the lowest for any ethnicity. In addition, there are many households that receive rental assistance or are on a waiting list to receive it. There are approximately 8,862 households that the county supports through rental assistance and from 2014 to 2015, the number of households waiting to receive rental assistance doubled to reach 34,955 households (SBC, 2015c).

In the City of Barstow, Latinos account for 43.2% of the population, Black or African American for 13.2%, Asian or Pacific Islander for 6.5%, American Indian and Alaska Native for 1.4%, and 3.6% for more than one race. The percent of the population in poverty was 30.2% (Census, 2014).

Based on five year estimates from 2010-2014, the population of Fort Irwin is less diverse than San Bernardino County and the City of Barstow; it includes 24.9% Hispanic or Latino, 46.4% White, 15.1% Black or African American, 7.5% Asian, 1.4% American Indian and Alaska Native, and the remaining population consists of two or more races (U.S. Census, 2014). In 2014, the percentage of persons living in poverty at Fort Irwin was estimated at 10.6%, compared with 20.4% in San Bernardino County and 16.4% in California (Census, 2014).

Protection of Children

The protection of children is an additional component of the Environmental Justice analysis, intended to determine if an action would place undue burden on children. EO 13405, Protection of Children from Environmental Health Risks and Safety Risks, recognizes a growing body of scientific knowledge that demonstrates that children may suffer disproportionately from environmental health risks and safety risks. These risks arise because: 1) children’s bodily systems are not fully developed; 2) children eat, drink, and breath more in proportion to their body weight; 3) their size and weight may diminish protection from standard safety features; and 4) their behavior patterns may make them more susceptible to accidents.

Based on these factors, federal agencies are directed by the office of the President to identify and assess the environmental health risks and safety risks that may disproportionately affect children and make them a high priority. Federal agencies were also directed to ensure that their policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks and safety risks.

The number of children within San Bernardino County, the City of Barstow, and Fort Irwin are provided in Table 3.10-3.

Table 3.10-3: Number of Children in San Bernardino County, Barstow, and Fort Irwin

Population Age Group	San Bernardino County	City of Barstow	Fort Irwin
Total Population	2,078,586	23,110	9,191
Under 5 years old	156,422	2,450	1,808
5 to 9 years	157,395	1,493	802
10 to 14 years	165,725	1,800	752
15 to 19 years	171,239	2,110	434

Source(s): Census, 2014. American Community Survey.

A relatively high proportion of the population at Fort Irwin is young children, compared with the City of Barstow and the County as a whole. Children under 5 years of age living at Fort Irwin are estimated at 19.7% of the total population, ages 5 to 9 years are estimated at 8.7%, 10 to 14 years at 8.2%, and 15 to 19 years at 4.7% (Census, 2014).

3.10.2 Environmental Consequences

A significant impact to the socioeconomic conditions within the ROI would occur if there were:

- Significant changes in the local labor force or employment;
- Increases in population that would reduce public service levels or aggravate any existing adverse conditions in the ROI; and
- Significant reductions in property taxes that would affect local government programs.

Impacts on minorities or low-income populations or to the health and safety of children within the ROI would occur if there were:

- Significant adverse environmental or human health impacts that would fall disproportionately on minority or low income populations, or populations less than 18 years of age and in areas with low-income, minority, and juvenile populations.

Proposed Action

Implementation of the ICRMP is expected to create minor, short-term beneficial impacts to the local economy. Revenues would be generated from cultural resources management activities as a result of funds spent off base for services (contractors), including restaurants, entertainment, shopping, housing, and the purchase of supplies and services for ongoing projects. Implementation of the ICRMP is not expected to result in an increase in Fort Irwin's full-time personnel. Therefore, there will be no impacts to the population at Fort Irwin or in the surrounding ROI.

The Proposed Action would cause no disproportionate environmental justice impact on minorities or low-income populations, nor would it impact the health and safety of children.

No Action Alternative

No significant impacts to the local or regional population or economy are expected under the No Action Alternative. Fort Irwin would continue to manage cultural resources under the 2011-2015 version of the ICRMP.

3.11 Infrastructure

This section describes infrastructure as the combination of supporting systems that enable the use of military land and resident facilities within the ROI. Transportation infrastructure, including roadways, and utility infrastructure, including energy, water, wastewater, communications, and solid waste, are described in this section. This section describes the affected environment and environmental consequences for infrastructure within the ROI.

3.11.1 Affected Environment

The ROI for infrastructure that could potentially be affected by the Proposed Action occurs within the Fort Irwin boundary. Transportation refers to the movement of vehicles throughout a road and highway network, as well as pedestrian and bicycle activity. The local transportation system at Fort Irwin consists of roadways, pedestrian walkways, and bike paths and is used for normal on-post traffic demands for everyday working, living, or recreational trips (Army, 2011).

Off-post personnel commute to and from work daily; additionally, retired military and family members, living off installation, use facilities at the installation. The cantonment roadway network serves the transportation needs of people living and working at Fort Irwin. There is limited public transportation, but bus service is provided daily between the installation and both Barstow and Victorville (Army, 2011). Additionally, there are several daily car pools (Army, 2006). Fort Irwin's utility infrastructure includes energy, water, wastewater, stormwater, communications, and solid waste.

Roads and Conditions

Major roads within the cantonment area are North Loop Road, Inner Loop Road, and South Loop Road. Access to the installation is via Fort Irwin Road, which is a two-lane defense access road (DAR). Fort Irwin Road provides public and military access to Fort Irwin from Interstate 15 (I-15), northeast of Barstow. San Bernardino County and the Army provide funding for rehabilitation and other improvements on Fort Irwin Road through the DAR program. The DAR Program is part of the Federal Lands Highway Program under Department of Transportation, and was established for the military to fund the cost of public highway improvements necessary to mitigate impacts of defense activity.

Historically, Fort Irwin Road has been a paved, county-maintained road that provides one lane in each direction with numerous sections containing passing lanes. Fort Irwin Road can also be accessed by Irwin Road, which extends from Barstow northeast to Fort Irwin Road. Irwin Road has two lanes, one in each direction, and is maintained by San Bernardino County.

The Manix Trail provides military access to Fort Irwin from I-15. The Manix Trail is made up of a series of dirt roads and trails that extend from the Manix railhead on the Union Pacific Railroad next to I-15, northwest into Fort Irwin. The Army uses the Manix Trail to transport visiting training units' equipment to and from Fort Irwin for military training exercises (CALIBRE 2005).

Fort Irwin access roads and military supply routes are generally unpaved or semi-improved using gravel to stabilize the sandy earth below. Reinforced concrete pads are provided at some intersections and at other mid-block crossings that are designed to accommodate heavy tactical vehicle movements where the road could not withstand such heavy use (Army, 2011).

Traffic Flow and Safety

Fort Irwin generates 90 percent of the traffic using Fort Irwin Road. The remainder of the traffic comes from ranches, mines, and homes in the area. Heavy transport vehicles and privately owned automobiles share this road. The amount of heavy traffic use and congestion on this two-lane highway has increased steadily with Fort Irwin's growth. While heavy traffic exists at all times, it is especially heavy during peak hours (morning and evening). Safety problems and dangerous conditions exist.

The existing 100 miles of paved roadways and 45 miles of graded roadways within the cantonment area serve the needs and mission of the installation. No traffic volume counts exist for the roadways on Fort Irwin; however, no direct evidence of excessive traffic congestion appears on the installation (Army, 2011). Some congestion at the center of the installation does occur during the rush hours (morning, noontime, and evening); however, Fort Irwin roadways appear to operate within their design capacities.

Intersection Control

Traffic control includes traffic signal and standard road signage. Low traffic flows at Fort Irwin result in a limited number of intersection controls. Those at the installation include standard signage such as four-way stop signs, yield signs, and pavement markings. Traffic signals are located at the entrance to Fort Irwin on Fort Irwin Road and at the intersection of South Loop Road and Langford Lake Road.

Pedestrian and Bicycle Paths

A network of concrete and asphalt paths and sidewalks link various family and troop housing and provides access to administrative areas. These sidewalks, bike lanes, and paths are located throughout the installation and are available to residents for pedestrian and bicycle use. One area not well served with pedestrian and bicycle paths is a site of older operations and barracks located south of Barstow Road.

Privately Owned Vehicle Parking

Privately owned vehicle parking facilities are generally adequate at Fort Irwin; however, some isolated facilities experience congestion and inadequate parking during peak use times (i.e. baseball fields). Additionally, around the main cantonment area, where roadways and parking areas are combined, drivers backing out of parking spaces directly into street traffic lanes pose a problem for traffic flow (Army, 2011).

Aircraft Facilities

Bicycle Lake Army Airfield serves Fort Irwin as the only on-post airfield. It is located on a dry lakebed 2.5 miles north of the cantonment area. Other helicopter and airstrip facilities are used in support of the hospital and training areas at the installation. The helipad is located immediately north of Weed Army Community Hospital and adjacent to Inner Loop Road (Army, 2011).

Utilities

Existing utility infrastructure at Fort Irwin, such as energy, water, wastewater, communications, and solid waste are described below.

Water Distribution

Fort Irwin's Water System is operated under a private contract with CH2MHILL. However, compliance responsibilities still reside with Fort Irwin. Fort Irwin draws water from wells installed in three aquifers located at Bicycle Lake, Langford Lake, and Irwin groundwater basin. Fort Irwin has two water systems. A reverse osmosis (RO) system and a domestic use (DU) system. The DU water is higher than the California Maximum Contaminant Levels standard for fluoride (2 milligrams per liter [mg/L]). The DU water is also higher than both the U.S. Environmental Protection Agency and State of California standard of Arsenic (10 micrograms per liter). DU water is intended for use in washing, cleaning, irrigation, and other non-potable uses. Both arsenic and fluoride in the water comes from erosion of natural deposits (Army, 2015).

Fort Irwin treats a portion of the DU water at the RO water treatment plant. The RO treatment process removes contaminants, including fluoride and arsenic, to ensure drinking water meets all state and federal safe drinking water standards. The RO water is blended with the DU water to provide an adequate volume of drinking water while still achieving health standards. This water should be used for drinking and cooking. Drinking water is drawn from a designated faucet located at kitchen sinks and in some bathrooms of each housing unit.

Reverse Osmosis Treatment Facility

The RO facility originally was designed in 1988 for Irwin groundwater basin Well I-2A, which was taken out of service in 1996 due to high nitrate levels. The RO facility was upgraded then to treat disinfected domestic water from the water storage tanks. The RO system effectively removes all fluoride and arsenic in the treated water. RO-treated water with a fluoride concentration of approximately 0.1 mg/L is blended with domestic water to meet the desired concentration for prevention of dental cavities (0.6 - 0.8 mg/L) before being pumped into the distribution system. The RO facility generates a waste stream from backwashing granular activated charcoal, from the sand filters, and from cleaning the RO system. Also, the RO system generates a continuous concentrated brine stream. All waste streams discharge to the sanitary sewer system and are eventually conveyed to the waste water treatment plant (WWTP) at Fort Irwin.

Wastewater Collection

Fort Irwin has an extended aeration WWTP that consists of a headworks facility, oxidation ditch, two secondary clarifiers, sodium hypochlorite generators for disinfection, and an effluent disposal field. Fort Irwin expanded the WWTP to include a tertiary treatment system. The new system consists of equalization basins to collect flow after the secondary clarifiers, a pump station, filters, and a chlorine contact basin with provision to divert flow prior to chlorination to the effluent percolation ponds. The tertiary system is designed to meet Title 22 regulations for effluent reuse. Water previously treated to secondary standards has been used for irrigating a restricted-access golf course. With the new tertiary system in place, the planned use areas for recycled water will include the pitch-and-putt area of the golf course, dust suppression, construction areas, and irrigation of five permit-designated areas (Army, 2011). Recent historical flow data recorded at the Fort Irwin WWTP indicate that the average daily flow is 0.98 millions of gallons per day (mgd) and the maximum average flow is 1.31 mgd. While the plant can adequately treat a greater volume of wastewater, the permit requires Fort Irwin to plan for a second oxidation ditch if the inflow exceeds 1.5 mgd, which is 75 percent of the permitted capacity, for 30 consecutive days. Overall, the sanitary sewer collection system provides adequate service. Additional capacity upgrades were made to the original system by replacing and expanding the main trunk lines across the cantonment area, which has ensured effective removal of wastewater from the installation. The peak capacity of the outfall line is approximately 7.5 mgd, which is sufficient capacity to allow for an

average flow rate of 3.0 mgd, based on a 2.5 peaking factor. Considering the average flow rate of the outfall line, the collection system can support an effective population of almost 43,000 (Army, 2011).

Stormwater Collection

A small portion of Fort Irwin is served by a storm drain system. Most stormwater drains by surface flow, with flow during high-intensity rainfall percolating into the sandy soil of dry washes or collecting in playas. Low infiltration rates in the evaporated clay lakebeds result in temporary ponding. The playas range in size from 340 acres to 1,300 acres (Army, 2011).

Stormwater runoff from the mountainous regions surrounding the cantonment area flows directly toward the developed areas of the installation. Drainage ditches along the northern edge of the cantonment area collect the runoff and divert it around the installation to the south where it is allowed to evaporate. Within the cantonment area, streets and curbs control stormwater drainage. One storm drain system serves a small troop housing area in the cantonment region, encompassing surface drains and piping. Stormwater is directed around the housing area into a collection pipe on Barstow Road. The collection pipe has a northeasterly flow along Barstow Road and eventually discharges into a vacant field. Other smaller self-contained storm drain systems typically collect localized stormwater runoff from maintenance areas and direct it to oil/water separators prior to discharge.

Energy Sources

Fort Irwin uses liquid petroleum gas (LPG) as its energy source for space heating and hot water heating. The fuel is conveyed by truck to the installation and stored in five tanks at Facility 4996 and four tanks at Facility 841 (Army, 2011).

Southern California Edison (SCE) owns the electrical system at Fort Irwin and is responsible for providing adequate electrical capacity and service to the installation. The Tiefert Substation houses two 28-megavolt ampere transformers. The substation steps down a 115-kilovolt (kV) line to 33 kV, feeding two distribution substations in the interior of the base, the Military Substation and Irwin Substation. Significant increases in capacity have been made to these two substations in recent years. SCE is continuously planning and expanding the electrical system to meet the current and future needs of Fort Irwin (Army, 2011).

Fort Irwin has set forth an aggressive goal to achieve Net Zero Energy by 2020. During 2012, the renewable energy generation capacity at Fort Irwin was approximately 175 kilowatts (kW). The generation is solely from roof top mounted photo voltaic systems. These renewable energy projects were part of major building renovations. Fort Irwin has been implementing conservation efforts through lighting retrofits to include energy efficient fluorescent technology, light-emitting diode (LED) technology, dimming ballasts, occupancy sensors and then networking the system to a central location for controllability (Porter, 2014).

Fort Irwin completed a project in 2012 to completely overhaul the lighting from 1.1 kW, High Intensity Metal Halide fixtures to 0.272 kW LED Fixtures. The calculated annual usage prior to the project was approximately 1,500,000 kilowatt hours. After the project was completed the total calculated annual usage is approximately 380,000 kWh. This is a reduction of approximately 75 percent and equates to approximately 233 pounds of Greenhouse Gas Reduction. This equates to approximately an \$85,000 yearly savings (Porter, 2014).

Other energy projects include the construction of two solar photovoltaic car ports which will have the capacity of approximately 750 kW of power. These car ports will have electric vehicle charging stations (Porter, 2014).

The design of the new hospital includes covered parking and photovoltaic array that will have the capacity of 2.4 megawatts of power that will meet about 90 percent power requirements for the hospital. The 216,000 square foot hospital facility will provide soldier and family patient care, emergency medicine, and a wide variety of clinical support. Additionally, it includes a 9,000-square-foot renovation of the Mary E. Walker Center and construction of a helipad, ambulance shelter, and central utilities plant. As well as being environmentally friendly and state-of-the-art energy efficient, the facility is being designed to achieve Leadership in Energy Environmental Design Platinum certification, the highest qualification and rating attainable for energy and resource efficiency in design and construction (Bari, 2015).

Communications

Verizon, a public telephone service company, provides facilities and equipment for public and family housing areas of the cantonment area. Cable lines for local and commercial use serve the installation. Additionally, other providers contracted with the installation provide communication services.

Solid Waste Management

Fort Irwin has set forth an aggressive goal to achieve Net Zero Waste by 2017. Fort Irwin is progressing with the implementation of a waste to energy plant that will consume all municipal waste, convert the waste into synthetic gas through a pyrolytic gaseous system process, leave a five percent char residue that can be used as a base during road construction, produce 1.1 megawatts of electricity and have a 90 percent reduction of waste (Bari, 2015).

Currently, the solid waste generated at Fort Irwin is disposed of at the permitted landfill on the installation. It includes municipal solid waste and wastes from commercial, industrial, construction, and demolition activities. Alternatively, waste is recycled or transported off the installation for appropriate disposal. Weed Army Community Hospital generates medical waste that is handled by a private contractor, and that is not disposed of in the installation landfill. Solid waste is collected and transported to the landfill on the installation by standard compacting garbage trucks. The base operations contractor collects waste from the garbage and recycling containers in the family housing areas on designated collection days. Most other installation facilities segregate garbage and recycling in large receptacles. The installation base operations contractor is responsible for collecting recyclable materials throughout the installation. Recyclable materials include aluminum beverage cans, tin and bimetal food and beverage containers, mixed office paper, corrugated cardboard, glass bottles and jars, plastic containers, and newspapers (Army, 2011).

The sanitary landfill at Fort Irwin is a Class III permitted facility, located approximately 1 mile east of the cantonment area. Class III landfills may accept only non-hazardous solid waste. Landfill operations at Fort Irwin began in the 1970s, with an expansion from 160 acres to 467 acres occurring in 1981. The active sanitary landfill is 18 acres, with the remaining landfill area subdivided into seven 25-acre disposal cells. Each cell is excavated to a depth of 25 feet below ground surface and will have a height of 60 feet above the existing grade. This portion of the landfill expansion area has a liner, a leachate collection system, and a baler facility. The total landfill capacity is estimated at 19 million cubic yards. The sanitary landfill is permitted to receive non-liquid, non-hazardous waste. The facility does not accept hazardous materials, hazardous waste, ammunition, petroleum, oil, lubricant-contaminated soil, oil-contaminated products, batteries, biological waste, friable asbestos, polychlorinated biphenyls, toxic

chemicals, or lithium/magnesium batteries. Employees at the landfill entrance inspect all deliveries to ensure that only acceptable materials are disposed of at the landfill (Army, 2011).

3.11.2 Environmental Consequences

Impacts to infrastructure are considered significant if:

- There are long-term disruptions in service or if emergency facilities such as hospitals or firefighting operations have service disruptions.
- Emergency vehicles cannot perform their duties or if traffic routes are disrupted for the long-term.

Proposed Action

Implementation of the ICRMP is not anticipated to result in significant impacts to infrastructure. Individual projects undertaken as part of the ICRMP could require the use of vehicles, thus increasing traffic. However, this would be expected to be negligible relative to other traffic. Additionally, implementation of the ICRMP or cultural resources management activities would not create additional usage of LPG, electrical service, drinking water, communications, or solid waste management beyond that which currently exists.

No Action Alternative

No significant impacts to infrastructure are expected under the No Action Alternative since no new activities would occur.

3.12 Proposed Best Management Practices

As discussed in the Environmental Consequences sections of this EA, no significant adverse impacts have been identified or are anticipated as a result of implementing either the Proposed Action or the No Action Alternative. As a result, no mitigation measures will be necessary to reduce any adverse environmental impacts to below significant levels. However, several BMPs have been included for the Proposed Action and are discussed in this section. It is important to note that BMPs and mitigation measures are not the same.

Mitigation is a general term that refers to actions implemented to avoid, minimize, rectify, reduce/eliminate, or provide compensation for an environmental impact. In 40 Code of Federal Regulations (CFR) 1508.20, the CEQ defines mitigation as:

- **Avoidance:** Avoids the impact by changing the action. Does not take certain actions that would cause the environmental effect.
- **Minimization:** Minimizes impacts by changing the intensity, timing, magnitude, or duration of the action and its implementation.
- **Rectifying:** Rehabilitating, repairing, or restoring damage that may be caused by implementing the Proposed Action.
- **Reducing/Eliminating:** Reduction or elimination of the impact over time.
- **Compensation:** Replacing damage and improving the environment elsewhere, or provide substitute resources such as funds to pay for the environmental impact.

Although BMPs mitigate potential impacts by avoiding, minimizing, or reducing/eliminating impacts, BMPs are distinguished from mitigation measures in this EA because BMPs are existing policies, practices, and measures required by law, regulation, or DoD policy that reduce the environmental impacts of designated activities, functions, or processes. The BMPs identified in this EA are inherently part of the Proposed Action and are not additional mitigation measures proposed as a result of the NEPA environmental review process for the Proposed Action. The following BMPs would be implemented for the proposed project.

Land Use Planning and Aesthetics

No significant impacts to land use or aesthetics would occur from implementation of the ICRMP; therefore, no mitigation measures are required for land use or aesthetics.

Geology, Soils, and Mineral Resources

BMP – Stormwater Management

Desert soils are highly susceptible to erosion; therefore, desert soils that are disturbed are highly susceptible to wind and water erosion. Certain site activities and conditions may result in erosion or loss of topsoil due to stormwater runoff. Prevention of soil erosion and loss of topsoil due to rainfall and stormwater will be addressed through the preparation of a Stormwater Pollution Prevention Plan (SWPPP). Site-specific stormwater BMPs would be detailed in a SWPPP prior to commencing individual projects undertaken as part of the ICRMP.

Biological Resources

Biological resources are protected through various federal and state laws and processes and Army regulations. The ICRMP discusses natural resource areas that are off limits to most activities except research. For instance, as discussed in Section 3.4 there are large restricted areas set aside for conservation of the desert tortoise, listed as threatened under the ESA and CESA. As a result, natural resource conservation areas also protect cultural resources.

BMP – Integration and Coordination

The ICRMP outlines AR 200-1 requirements to ensure that cultural resources management is coordinated and integrated into daily operations and other facility activities such as training and testing, master planning, environmental impact analysis, natural resources, and endangered species management planning (this includes the INRMP). By coordinating daily operations and other facility activities, the ICRMP ensures that biological resources are protected.

Water Resources

Implementation of the ICRMP is not anticipated to result in significant impacts to water resources, however in the event that soil erosion and loss of topsoil due to rainfall and stormwater occurs, a SWPPP will be prepared to mitigate impacts. No impacts to groundwater or water quality are expected.

Air Quality

Current activities at Fort Irwin, such as vehicle travel on unpaved roads and training maneuvers, create fugitive dust. Currently, Fort Irwin operates eight monitoring sites located along the boundary of the installation, in the Superior Valley, and Silurian land expansion areas. Fort Irwin has implemented a number of standard management practices to reduce particulate emissions, including the following:

- Using water (including recycled) for short-term surface stabilization
- Minimizing tracking of dirt onto paved roads
- Covering haul trucks
- Stabilizing sites with chemicals or vegetation
- Paving parking lots
- Placing gravel to control windblown dust

Additional BMPs to reduce air quality impacts will include regular vehicle maintenance, the use of more efficient cleaner fuel vehicles, and use of the appropriate type or size vehicle for the need (i.e. passenger car versus truck).

Noise

Implementation of the ICRMP is not anticipated to result in significant noise impacts. By ensuring that only activities compatible with specific LUPZ and noise zones are performed within these zones, noise impacts will be limited.

Cultural Resources

BMP – ICRMP SOPs

The ICRMP contains a series of goals, objectives and SOPs that enable Fort Irwin to meet its legal responsibilities for the management of cultural resources. The SOPs are based on applicable federal, state, and local environmental laws and regulations, Army regulations and formal agreements that are designed to help avoid adverse impacts to meet Fort Irwin's cultural resources management goals. In addition to specific SOPs, the ICRMP also provides SOPs for routine activities that may have an impact on cultural resources. By following these SOPs Fort Irwin is essentially applying BMPs to protect cultural resources. Some of these BMPs are discussed below.

BMP – Fencing

Where possible, protection of cultural resources should include marking with Sibert stakes (reflective horizontal bands atop fence posts), signs and fencing, periodic monitoring for evidence of unauthorized ground disturbance or other negative effects.

BMP – Vehicle Barriers

To protect cultural resources from accidental incursions and maneuver damage from tracked and wheeled vehicles, vehicle barriers are constructed.

BMP – Restrictions

Certain portions of Fort Irwin land are designated as off limits to most activities with the exception of research, thereby protecting cultural resources. These areas consist of natural and cultural resource conservation areas, dry lake playas, and Desert Tortoise habitat.

BMP – SHPO Consultation

For post review discoveries, an assessment would be made for National Register of Historic Places eligibility in consultation with the SHPO.

For areas or properties that have not been inventoried for historic properties, Fort Irwin would follow the SOPs as outlined in the ICRMP and Section 106 consultation.

BMP – Treatment Plan

Where protection is not possible, a treatment plan will be developed and implemented for the site in consultation with the SHPO and tribes.

BMP – Education and Outreach

Fort Irwin will continue to provide education and public outreach for increased awareness to fulfill requirements of Army Regulation AR 200-1 and make soldiers and family members aware of their responsibilities to preserve and protect these limited resources for future generations.

Paleontological Resources

Paleontological resources fall under the same protection considerations as outlined in the ICRMP SOPs. Various applicable federal, state, and local environmental laws and regulations, Army regulations and formal agreements are designed to help avoid adverse impacts to paleontological resources. The Army vigorously pursues the protection of paleontological resources from theft, destruction and other illegal or unauthorized uses.

BMP – Paleontological Inventories

All Army programs that may have an adverse impact on paleontological resources through their actions or authorizations are responsible for funding any necessary resource inventories, evaluations or other work needed to avoid or mitigate adverse impacts on paleontological resources.

Socioeconomic and Environmental Justice

No significant impacts to socioeconomic or environmental justice would occur from implementation of the ICRMP; therefore, no mitigation measures are required.

Infrastructure

No significant impacts to infrastructure would occur from implementation of the ICRMP; therefore, no mitigation measures are required.

CHAPTER 4 - CUMULATIVE EFFECTS

4.1 Introduction

As required under the NEPA and the regulations implementing NEPA, this section analyzes potential cumulative effects from other past, present, and reasonably foreseeable future actions combined with the Proposed Action within the ROI specific to the resources for which cumulative effects may be anticipated. A cumulative effect is defined as an effect on the environment that results from the incremental effect of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such actions. Cumulative effects can result from individually minor, but collectively significant, actions taking place over a period of time (40 CFR 1508.7).

Cumulative effects should be evaluated in terms of the specific resource, ecosystem, and human community being affected. This analysis focuses cumulative effects of the Proposed Action and other actions both within and outside the boundaries of Fort Irwin. The ROI analyzed for each resource in Chapter 3 acts as the cumulative effects analysis area. The ROI size varies by resource. To determine the size of each ROI, each environmental resource was analyzed to determine the extent to which the environmental effect from the project could be reasonably detected and then the geographic areas of resources that could be affected were included. However, the cultural resources management activities associated with the Proposed Action would occur entirely within the boundaries of Fort Irwin. The past, present, and reasonably foreseeable future actions that could potentially interact with the Proposed Action to produce cumulative effects are described briefly in the following sections.

Land Use Planning and Aesthetics

The Proposed Action would be compatible with land use designations, consistent with applicable laws, policies and plans, and would not result in any additional effects on land use. No cumulative effects are anticipated on land use or aesthetics as a result of implementing the ICRMP.

Geology, Soils, and Mineral Resources

No cumulative geological, soil, or mineral effects would occur as a result of implementing the ICRMP because site specific BMPs would be implemented to prevent or mitigate potential effects to a less than significant level.

Biological Resources

Potential effects to biological resources are protected through various federal and state laws and processes and Army regulations, including implementation of the INRMP. By integrating and coordinating implementation of the ICRMP with daily operations and other facility activities it ensures that biological resources are protected. Cumulative biological effects are not anticipated to adversely affect biological resources.

Water Resources

No significant adverse cumulative effects to water resources are anticipated to occur as a result of implementing the ICRMP. The potential exists for short-term surface water quality changes during cultural resources management activities, and this has the potential to combine with other effects to surface water quality. However, given the short duration of the added effect during these activities, it is unlikely to result in any lasting damage to existing water resources. Any potential effects to surface water would be site-specific and would be mitigated to a less than significant level.

Air Quality

The long-term air quality effects expected to result from implementation of the ICRMP are negligible and would not contribute to any significant cumulative effects to regional air quality or violate federal, state, or local air regulations. The air emissions associated with ICRMP management activities would be *de minimis*, and when combined with proposed development on and off the installation, is not expected to affect the attainment status of the region.

Noise

Noise generated by the implementation of the ICRMP would be temporary and minor in context and intensity. Other activities combined with the cultural resources management activities associated with the ICRMP may create small surges in noise. However, they would not be anticipated to exceed acceptable thresholds (greater than 65 DNL) for nearby sensitive receptors. The noise may result in a temporary annoyance during the surge but would be less than significant given the short duration. Therefore, cumulative noise effects are anticipated to be less than significant.

Cultural Resources

The ICRMP guides the installation in ensuring that cultural resources are treated in compliance with applicable laws and regulations. All projects occurring at Fort Irwin are evaluated for their potential to affect cultural resources and are mitigated with the SOPs outlined in the ICRMP. Therefore, no cumulative effects would occur as a result of implementing the ICRMP.

Paleontological Resources

The ICRMP guides the installation in ensuring that paleontological resources are treated in compliance with applicable laws and regulations. All projects occurring at Fort Irwin are evaluated for their potential to affect paleontological resources and are mitigated with the SOPs outlined in the ICRMP. Therefore, no cumulative effects would occur as a result of implementing the ICRMP.

Socioeconomic and Environmental Justice

Implementation of the ICRMP, when considered with the growth of the surrounding community, is not anticipated to result in any significant cumulative effects. Since the Proposed Action would have no direct effects on population, demographics, employment, housing, and the demand on community services, no adverse cumulative socioeconomic effects are anticipated to occur. Short-term beneficial effects to the

local economy would be expected as a result of the implementation of the ICRMP when combined with other proposed Fort Irwin projects and the growth of the surrounding community. The combination of proposed projects would generate employment opportunities and support local business sales within the ROI. No cumulative environmental justice effects would occur as a result of implementing the ICRMP.

Infrastructure

Implementation of the ICRMP, when considered with foreseeable development projects at Fort Irwin, are not anticipated to result in any significant cumulative effects. Most development projects are planned within the cantonment area. These would involve construction/demolition for facilities; utilities, including water distribution infrastructure upgrades; and transportation network planning, including pedestrian/bicycle networks. Other infrastructure projects include environmental sustainability features such as solar photovoltaic fields; various Net-Zero energy projects and stormwater control features; green infrastructure planning improvements for major installation-wide landscape features to connect activity nodes with recreation areas and running trails; and integration of stormwater management systems with recreation opportunities and visual elements. The planned development projects that have the potential to be implemented during the same time as cultural resources management activities associated with the Proposed Action would not occur in the immediate vicinity of the foreseeable development projects. Therefore, there is little potential for adverse cumulative effects to occur if the Proposed Action coincides with one or more of the planned projects.

CHAPTER 5 - CONCLUSIONS

The Proposed Action to implement the ICRMP for the planning period of 2016 through 2020 is required under DoDI 4715.16, Cultural Resource Management, and AR 200-1, Environmental Enhancement and Protection. Implementation of the updated ICRMP assists in establishing procedures and long range goals for managing cultural and paleontological resources compliance with all applicable federal laws, regulations and installation guidelines. The Cultural Resources Program Manager, in coordination with other Fort Irwin Programs, such as with the Natural Resources Program team that implements the INRMP, will serve to preclude any significant effects that may result from cultural resources management actions. Therefore, based on the findings of this EA, implementation of the Proposed Action would not result in significant environmental effects.

Effects to physical, natural, and cultural resources that may result from ICRMP activities would be mitigated as part of a comprehensive, integrated program that the ICRMP represents. A summary of potential effects and measures to minimize effects is provided in Table 5-1.

Table 5-1: Summary of Potential Effects and Minimization Measures

Resource Area	Level of Anticipated Effect			Summary of Potential Effects and Minimization Measures
	Significant †	Less than Significant †	No Impact	
Land Use Planning and Aesthetics			√	<p>No significant effects to land use planning and aesthetics are anticipated as a result of the implementation of the Proposed Action. Projects proposed in the ICRMP and associated cultural resources management activities would not result in any inconsistencies with applicable land use laws or designations, loss of access to public and private lands, or degradation of the aesthetic character.</p> <p>No mitigation measures are required for land use or aesthetics.</p>
Geology, Soils, and Mineral Resources		√		<p>No effects to geology or minerals are expected. No significant effects to soils are anticipated. Minor short-term effects to soils would result from cultural resources management activities that involve ground disturbance.</p> <p>Site specific BMPs such as the preparation of a SWPPP, would be implemented to minimize soil disturbance and erosion. Soil resources are protected in areas that are off limits and individual cultural resources management activities would be reviewed under the INRMP to avoid effects to soil resources.</p>

<p>Biological Resources</p>		<p>√</p>	<p>No significant effects to biological resources are anticipated as a result of the implementation of the Proposed Action. Minor short-term effects to biological resources may result from cultural resources management activities that involve ground disturbance.</p> <p>However, under the INRMP, cultural resources management activities would be reviewed to evaluate potential biological effects prior to the start of individual projects, site specific BMPs would be implemented to minimize potential biological resource disturbance, and biological resources are protected in areas that are off limits.</p>
<p>Water Resources</p>		<p>√</p>	<p>No significant effects to water resources are expected as a result of the implementation of the Proposed Action. Projects proposed in the ICRMP and associated cultural resources management activities would be evaluated for potential effects. No effects to groundwater or water quality are expected.</p> <p>Site-specific plans would be developed and a SWPPP will be obtained, if necessary, to minimize the potential for nonpoint source pollutants affecting water resources. Water resources are protected in the areas where springs and playas are off limits to all training. Fort Irwin educates field personnel about the off limits nature of spring locations as part of major briefings prior to each military exercise in order to to avoid impacts by military equipment and personnel. Fort Irwin erects fencing and metal crossbars at springs likely to be approached by wheeled and tracked vehicles in an effort to reduce accidental intrusion into and subsequent damage to these resources.</p>
<p>Air Quality</p>		<p>√</p>	<p>No significant effects to air quality are expected. Potential effects would be expected during certain cultural resources management activities. Most activities' emissions would be fugitive dust and vehicle and equipment exhaust. Overall, effects would be less than significant and would not contribute significant emissions to local or regional air quality.</p> <p>Standard management practices and site specific BMPs would be implemented to minimize potential fugitive dust.</p>

Noise		√		<p>No significant effects would result from the noise generated by the Proposed Action. Noise associated with project vehicles and equipment would be consistent with noise already occurring at Fort Irwin.</p> <p>No mitigation measures are required for noise effects.</p>
Cultural Resources		√		<p>No significant effects to cultural resources are anticipated as a result of the implementation of the Proposed Action. Minor, indirect, and long-term positive effects to cultural resources are expected as a result of the implementation of the ICRMP. The objective of the ICRMP is to protect and preserve the cultural resources at Fort Irwin.</p> <p>The SOPs outlined in the ICRMP are based on applicable federal, state, and local environmental laws and regulations, Army regulations, and formal agreements that are designed to help avoid adverse impacts to meet Fort Irwin’s cultural resources management goals. In addition to specific SOPs, the ICRMP also provides SOPs for routine activities that may have an effect on cultural resources. These SOPs are essentially BMPs such as fencing and restrictions, SHPO consultation, education and outreach, and developing Treatment Plans for the protection of cultural resources.</p>
Paleontological Resources		√		<p>No significant effects to paleontological resources are anticipated as a result of the implementation of the Proposed Action. Minor, indirect, and long-term positive effects to paleontological resources are expected as a result of the implementation of the ICRMP. Paleontological resources fall under the same protection considerations as outlined in the ICRMP SOPs.</p> <p>Various applicable federal, state, and local environmental laws and regulations, Army regulations and formal agreements are designed to help avoid adverse effects to paleontological resources. The Army vigorously pursues the protection of paleontological resources from theft, destruction and other illegal or unauthorized uses. The same BMPs applied to cultural resources apply to paleontological resources as well as conducting paleontological inventories and briefings through education and outreach for the protection of paleontological resources.</p>

<p>Socioeconomics and Environmental Justice</p>		<p>√</p>		<p>No significant effects to socioeconomics are anticipated as a result of the implementation of the Proposed Action. Short-term, minor, beneficial effects to the local economy may result from increased sales volumes during the duration of some proposed activities. No effects would result in environmental injustice or human health and safety issues.</p> <p>No mitigation measures are required for socioeconomic and environmental justice issues.</p>
<p>Infrastructure</p>		<p>√</p>		<p>No significant effects to infrastructure are anticipated as a result of the implementation of the Proposed Action.</p> <p>No mitigation measures are required for infrastructure.</p>

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APPENDIX A

Integrated Cultural Resources Management Plan 2016-2020 for Fort Irwin and the National Training Center