Final
Environmental Assessment for Proposed Integrated Natural Resources Management Plan Projects at Nellis Air Force Base and the Nevada Test and Training Range, Nevada

May 2024

Prepared for:
United States Air Force
99th Air Base Wing

PRIVACY ADVISORY

This Environmental Assessment (EA) is provided for public comment in accordance with the National Environmental Policy Act (NEPA), the President's Council on Environmental Quality (CEQ) NEPA regulations (40 CFR Parts 1500–1508), and 32 CFR Part 989, *Environmental Impact Analysis Process (EIAP)*.

The EIAP provides an opportunity for public input on Air Force decision-making, allows the public to offer inputs on alternative ways for the Air Force to accomplish what it is proposing, and solicits comments on the Air Force's analysis of environmental effects.

Public commenting allows the Air Force to make better, informed decisions. Letters or other written or oral comments provided may be published in the EA. As required by law, comments provided will be addressed in the EA and made available to the public. Providing personal information is voluntary. Any personal information provided will be used only to identify your desire to make a statement during the public comment portion of any public meetings or hearings or to fulfill requests for copies of the EA or associated documents. Private addresses will be compiled to develop a mailing list for those requesting copies of the EA; however, only the names of the individuals making comments and specific comments will be disclosed. Personal home addresses and phone numbers will not be published in the EA.

COMPLIANCE

This document has been certified that it does not exceed 75 pages, not including appendices, as defined in 40 CFR § 1501.5(f). In accordance with 40 CFR § 1508.1(v), a "page" means 500 words and does not include maps, diagrams, graphs, tables, and other means of graphically displaying quantitative or geospatial information.

ACCESSIBILITY NOTICE

This document is compliant with Section 508 of the Rehabilitation Act. This allows assistive technology to be used to obtain the available information from the document. Due to the nature of graphics, figures, tables, and images occurring in the document, accessibility is limited to a descriptive title for each item.

Cover photo: Nellis AFB Natural Resources team conducting targeted surveys and monitoring for threatened, endangered, and sensitive species.

COVER SHEET
Final Environmental Assessment for
Proposed INRMP Projects at Nellis AFB and the NTTR, Nevada

a. *Responsible Agency: United States Air Force*

b. *Location: Nellis Air Force Base, Nevada*

c. *Designation: Final Environmental Assessment*

d. *For Additional Information:* Ms. Sirin Toksoz Jewell, NEPA Program Manager, 6020 Beale Avenue, Nellis AFB, Nevada. Phone: 702-652-9366 or by email at sirin.toksoz_jewell.1@us.af.mil

Abstract:

The United States Air Force (Air Force) at Nellis Air Force Base (AFB) has prepared this Environmental Assessment (EA) in accordance with the *National Environmental Policy Act* to evaluate the potential impacts of implementing proposed INRMP projects on Nellis AFB and the NTTR. The INRMP is being developed to support the military mission while facilitating effective ecosystem and natural resource management for Nellis AFB and the NTTR to minimize impacts of military operations on natural resources and develop an appropriate natural resource management framework. The INRMP has established long-term goals, objectives, and projects for management and protection of natural resource assets integral to carrying out the military mission and provides guidance on avoiding impacts to natural resources during the planning, designing, and management phases of new construction/expansion projects when practicable.

Potentially affected environmental resources were identified in coordination with local, state, and federal agencies. Specific environmental resources with the potential for environmental consequences include land use; air quality and climate change; earth, water, biological, and cultural resources; infrastructure, including transportation and utilities; and safety.

The analysis of the affected environment and environmental consequences of implementing the Proposed Action and No Action Alternative, concluded that by implementing standing environmental protection measures and Best Management Practices, there would be no significant adverse impacts to the environmental resources from the proposed INRMP Projects. Nellis AFB is an active installation with aircraft operations and new development actions currently under way as well as future development currently in the planning phase. Impacts associated with the INRMP projects would be minor; therefore, significant cumulative impacts are not anticipated from activities associated with the Proposed Action when considered in conjunction with other past, present, or reasonably foreseeable environmental trends or future actions at Nellis AFB.

This page intentionally left blank

TABLE OF CONTENTS

CHAPTER 1 PURPOSE AND NEED FOR THE PROPOSED ACTION 1-1

1.1 INTRODUCTION 1-1
1.2 LOCATION 1-2
1.2.1 Nellis AFB 1-2
1.2.2 Nevada Test and Training Range 1-2
1.3 PURPOSE AND NEED 1-2
1.4 SCOPE OF THE ENVIRONMENTAL ASSESSMENT 1-6
1.5 INTERGOVERNMENTAL COORDINATION, PUBLIC AND AGENCY PARTICIPATION 1-6
1.5.1 Government-to-Government Consultation 1-6
1.5.2 Agency Consultations and Coordination 1-7
1.5.3 Public and Agency Review 1-7
1.6 DECISION TO BE MADE 1-7
1.7 APPLICABLE LAWS AND ENVIRONMENTAL REGULATIONS 1-8

CHAPTER 2 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES 2-1

2.1 INTRODUCTION 2-1
2.2 DESCRIPTION OF THE PROPOSED ACTION 2-1
2.2.1 List of Proposed Projects Categorized by Goals and Objectives 2-1
2.3 SELECTION STANDARDS FOR ALTERNATIVE SCREENING 2-11
2.4 ALTERNATIVES RETAINED FOR DETAILED ANALYSIS 2-11
2.4.1 Proposed Action 2-11
2.4.2 No Action Alternative 2-11
2.5 SUMMARY OF ENVIRONMENTAL CONSEQUENCES 2-12

CHAPTER 3 EXISTING CONDITIONS AND ENVIRONMENTAL CONSEQUENCES 3-1

3.1 FRAMEWORK FOR ANALYSIS 3-1
3.2 RESOURCES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS 3-2
3.3 RESOURCES CARRIED FORWARD FOR DETAILED ANALYSIS 3-2
3.4 LAND USE 3-2
3.4.1 Definition of Resources 3-2
3.4.2 Existing Conditions 3-2
3.4.3 Environmental Consequences 3-3
3.5 EARTH RESOURCES 3-5
3.5.1 Definition of the Resource 3-5
3.5.2 Existing Conditions 3-5
3.5.3 Environmental Consequences 3-9
3.6 AIR QUALITY AND CLIMATE CHANGE 3-11
3.6.1 Definition of the Resource 3-11
3.6.2 Existing Conditions 3-14
3.6.3 Environmental Consequences 3-16
3.7 WATER RESOURCES 3-19
3.7.1 Definition of the Resource 3-19
3.7.2 Existing Conditions 3-21
3.7.3 Environmental Consequences 3-25
3.8 BIOLOGICAL RESOURCES 3-27
3.8.1 Definition of the Resource 3-27
3.8.2 Existing Conditions 3-28
3.8.3 Environmental Consequences 3-32
3.9 CULTURAL RESOURCES 3-41
3.9.1 Definition of the Resource 3-41
3.9.2 Existing Conditions 3-42
3.9.3 Environmental Consequences 3-43
3.10 INFRASTRUCTURE, INCLUDING TRANSPORTATION AND UTILITIES 3-44

3.10.1 Definition of the Resource *3-44*
3.10.2 Existing Conditions *3-45*
3.10.3 Environmental Consequences *3-46*
3.11 SAFETY AND OCCUPATIONAL HEALTH 3-48
3.11.1 Definition of the Resource *3-48*
3.11.2 Existing Conditions *3-48*
3.11.3 Environmental Consequences *3-51*

CHAPTER 4 LIST OF PREPARERS 4-1

4.1 GOVERNMENT CONTRIBUTORS 4-2

CHAPTER 5 REFERENCES 5-1

APPENDICES

APPENDIX A. Intergovernmental Coordination, Public and Agency Participation
APPENDIX B. Air Conformity Applicability Model Analysis
APPENDIX C. Analysis of Threatened, Endangered, and Sensitive Species Known or with the Potential To Occur on Nellis AFB or the NTTR

LIST OF FIGURES

Figure 1-1 Regional Overview 1-3
Figure 1-2 Nellis AFB Aerial Overview 1-4
Figure 1-3 NTTR Aerial Overview 1-5
Figure 3-1 Land Use 3-4
Figure 3-2 Soils 3-8
Figure 3-3 Nellis AFB Water Resources 3-22
Figure 3-4 NTTR Water Resources 3-23
Figure 3-5 Nellis AFB Biological Resources 3-33
Figure 3-6 NTTR Biological Resources 3-34
Figure 3-7 NTTR Infrastructure 3-47
Figure 3-8 Safety 3-50

LIST OF TABLES

Table 2-1. Summary of Environmental Consequences 2-12
Table 3-1. Past, Present, and Reasonably Foreseeable Environmental Trends and Planned Actions 3-1
Table 3-2. Soil Types at Nellis AFB[a] 3-7
Table 3-3. National Ambient Air Quality Standards 3-12
Table 3-4. Nellis Air Force Base Mobile and Stationary Source Emission Summary 3-15
Table 3-5. Annual Air Emissions, LVIAQCR 3-17
Table 3-6. Highest Annual Air Emissions and PSD Thresholds, LVIAQCR 3-17
Table 3-7. Annual Air Emissions, NIAQCR 3-18
Table 3-8. Highest Air Emissions and Annual PSD Thresholds, NIAQCR 3-18

ACRONYMS AND ABBREVIATIONS

99 ABW	99th Air Base Wing
ACAM	Air Conformity Applicability Model
ACC	Air Combat Command
AFB	Air Force Base
AFI	Air Force Instruction
AFMAN	Air Force Manual
AICUZ	Air Installations Compatible Use Zones
AMSL	above mean sea level
APE	Area of Potential Effect
APZ	Accident Potential Zone
BASH	Bird/wildlife Aircraft Strike Hazard
BLM	Bureau of Land Management
BMP	Best Management Practice
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CSU	Colorado State University
CWA	Clean Water Act
CZ	Clear Zone
DES	Department of Environment and Sustainability
DNWR	Desert National Wildlife Range
DoD	Department of Defense
DoDI	Department of Defense Instruction
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
ESQD	Explosive Safety Quantity Distance
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
GHGs	Greenhouse gases
GIS	geographic information system
GPS	global positioning system
HAZMAT	Hazardous Materials
I-15	Interstate 15
ICRMP	Integrated Cultural Resources Management Plan
IGI&S	Installation Geospatial Information and Services
INRMP	Integrated Natural Resources Management Plan
LVIAQCR	Las Vegas Intrastate Air Quality Control Region
MBTA	Migratory Bird Treaty Act
MOU	Memorandum of Understanding
NAAQS	National Ambient Air Quality Standards
NDEP	Nevada Department of Environmental Protection
NDOW	Nevada Department of Wildlife
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NIAQCR	Nevada Interstate Air Quality Control Region
NPDES	National Pollution Discharge Elimination System
NRHP	National Register of Historic Places
NRS	Nevada Revised Statutes
NTTR	Nevada Test and Training Range
OSHA	Occupational Health and Safety Administration
PIT	passive integrated transponder

PSD	Prevention of Significant Deterioration
ROI	Region of Influence
SAR	Small Arms Range
TCP	Traditional Cultural Properties
TPY	tons per year
US	United States
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

CHAPTER 1 PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

Nellis Air Force Base (AFB) is an Air Combat Command (ACC) Base located outside of Las Vegas, Nevada. ACC organizes, trains, and equips combat-ready forces to provide dominant combat airpower in support of national security strategy implementation. Nellis AFB is home to the 99th Air Base Wing (99 ABW), Air Force Warfare Center, 57th Wing, 99th Civil Engineering Squadron, the Nevada Test and Training Range (NTTR), elements of the 53rd Wing and 505th Command Control Wing, and more than 52 tenant units and agencies. The 99 ABW is the host wing for Nellis AFB and the NTTR and is responsible for two groups: the 99th Mission Support Group and the 99th Medical Group.

The United States (US) Air Force (Air Force) is proposing to revise the Integrated Natural Resources Management Plan (INRMP) for Nellis AFB and the NTTR. As with the 2019–2023 INRMP (Nellis AFB, 2019), the revised INRMP is being developed to support the military mission while facilitating effective ecosystem and natural resource management for Nellis AFB and the NTTR to minimize impacts of military operations on natural resources and develop an appropriate natural resource management framework. Creech AFB now has Independent Command Authority and is developing its own INRMP, which is expected to be signed and final by the end of fiscal year 2023. Therefore, Creech AFB is no longer represented in the INRMP for Nellis AFB and the NTTR.

The Air Force prepared this Environmental Assessment (EA) to analyze potential environmental impacts associated with implementing INRMP projects to meet the goals and objectives identified and agreed upon by the signatories of the INRMP, including, but not limited to, conducting survey work for identified taxa; installing and maintaining equipment such as cameras and acoustic monitors; treating invasive species with approved herbicides; monitoring water parameters; trapping and releasing species according to state and federal permit requirements; managing urban forestry; conducting habitat restoration projects for the benefit of special-status species; installing and monitoring exclusionary fences around sensitive areas; maintaining permits for flight safety; conducting hazardous fuel reduction projects to reduce the threats of wildland fire; updating the Natural Resources Environmental Geographic Information System (GIS) Database to inform management decisions; and conducting educational outreach. These projects are further described throughout this EA and collectively referred to as the "Proposed Action."

The EA will be prepared in accordance with the *National Environmental Policy Act of 1969*, as amended (42 *United States Code* [USC] § 4321 et seq.) (NEPA); the Council on Environmental Quality (CEQ) NEPA regulations (40 *Code of Federal Regulations* [CFR] Parts 1500–1508); and the Air Force NEPA regulations at 32 CFR Part 989, *Environmental Impact Analysis Process (*EIAP*)*. Per the updated CEQ NEPA regulations, this EIAP complies with the prescriptive timeline and page limits for an EA; 40 CFR § 1500.1(b), 40 CFR § 1506.6, and 40 CFR § 1507.4 provide purpose and direction for streamlining the NEPA process. To render this document more concise, links are provided to online data sources to which the reader can refer for more information. Should the reader not have internet access, please contact the Air Force point of contact listed on the **Cover Sheet** of this EA and accommodations will be made to provide printed copies of relevant information requested.

The information presented in this EA will serve as the basis for deciding whether the projects would result in a significant impact to the human or natural environment, requiring the preparation of an Environmental Impact Statement, or whether no significant impacts would occur, in which case a Finding of No Significant Impact (FONSI) would be issued. If execution of the Proposed Action or Alternatives would unavoidably occur in a wetland or floodplain, a Finding of No Practicable Alternative would be prepared in conjunction with the FONSI, pursuant to the requirements of Executive Order (EO) 11990, *Protection of Wetlands*, and EO 11988, *Floodplain Management*.

1.2 LOCATION

1.2.1 Nellis AFB

Nellis AFB, located in Clark County in the southeast corner of the state of Nevada, lies 5 miles northeast of the city of Las Vegas. The Base is bordered on the west and south by the unincorporated township of Sunrise Manor (**Figure 1-1**). Nellis AFB is the center for ACC training and testing activities at the NTTR, providing logistical and organizational support, aircraft training, and personnel for the range, which is home to America's most advanced aerial test and training environment, providing aircrew with a peacetime battlefield to hone their combat skills.

Sunrise Manor and undeveloped portions of Clark County surround the majority of Nellis AFB, although open space dominates to the northeast (**Figure 1-2**). Covering 16,439.21 acres, Nellis AFB contains three major functional areas. Area I, the Main Base, is located east of Interstate 15 (I-15) and includes the airfield and most Base functions. Area II, northeast of the Main Base, contains the Munitions Storage Area/Weapons Storage Area. Area III, situated northwest of the Main Base, contains a number of facilities such as a hospital, storage, and housing. Nellis AFB also includes a Small Arms Range (SAR), which comprises 11,489.45 acres of land, Water Annex (North), which comprises 32.51 acres of land, and Water Annex (South), which comprises 38.65 acres of land all on the Base. The SAR is located northwest of I-15, and the northern portion of the SAR partially overlaps the Desert National Wildlife Range (DNWR). Except for several buildings and access roads, the SAR consists of undeveloped desert scrub land.

1.2.2 Nevada Test and Training Range

The NTTR is located northwest of Nellis AFB within Clark, Lincoln, and Nye counties, Nevada, and occupies 2.9 million acres of land. The Nevada Wild Horse Range and DNWR are located within the NTTR. The airspace over the NTTR comprises 5,000 square miles, which is restricted from civilian air traffic over-flight, and another 7,000 square miles of Military Operations Area,[1] which is shared with civilian aircraft. Several small communities, ranches, and state parks are also located within the NTTR airspace, but the majority of the land is undeveloped (**Figure 1-3**).

The 12,000-square-nautical-mile range at the NTTR provides a realistic arena for operational testing and training aircrew and ground forces to improve combat readiness. The range within the NTTR was originally established as the Las Vegas Bombing and Gunnery Range in 1940. The *Military Lands Withdrawal Act of 1999* (Public Law 106-65) extended the land withdrawal to 2021 and superseded any former land withdrawals. The *National Defense Authorization Act of 2021* extended the NTTR land withdrawal through 2046.

1.3 PURPOSE AND NEED

The purpose of the Proposed Action is to guide and document the manner in which Nellis AFB and the NTTR manage natural resources while supporting the military mission. The INRMP has established long-term goals, objectives, and projects for management and protection of natural resource assets integral to carrying out the military mission and provides guidance on avoiding impacts to natural resources during the planning, designing, and management phases of new construction/expansion projects when practicable. The Proposed Action is needed to ensure that Nellis AFB and the NTTR remain in compliance with the Sikes Act (Public Law 86-797) as amended; Air Force Manual (AFMAN) 32-7003, *Environmental Conservation*; Air Force Policy Directive 32-70, *Environmental Considerations in Air Force Programs and Activities*; and Department of Defense Instruction (DoDI) 4715.03, *Natural Resources Conservation Program*. The Sikes Act requires the development and implementation of an INRMP, the implementation of which requires the DoD to cooperate with federal and state agencies concerning conservation, protection, and management of fish and wildlife resources on military installations. The INRMP provides an important tool that is referenced during the planning, design, and construction phases of construction/expansion

[1] A Military Operations Area is a type of special-use airspace outside of Class A airspace to separate or segregate certain nonhazardous military activities from instrument flight rule traffic.

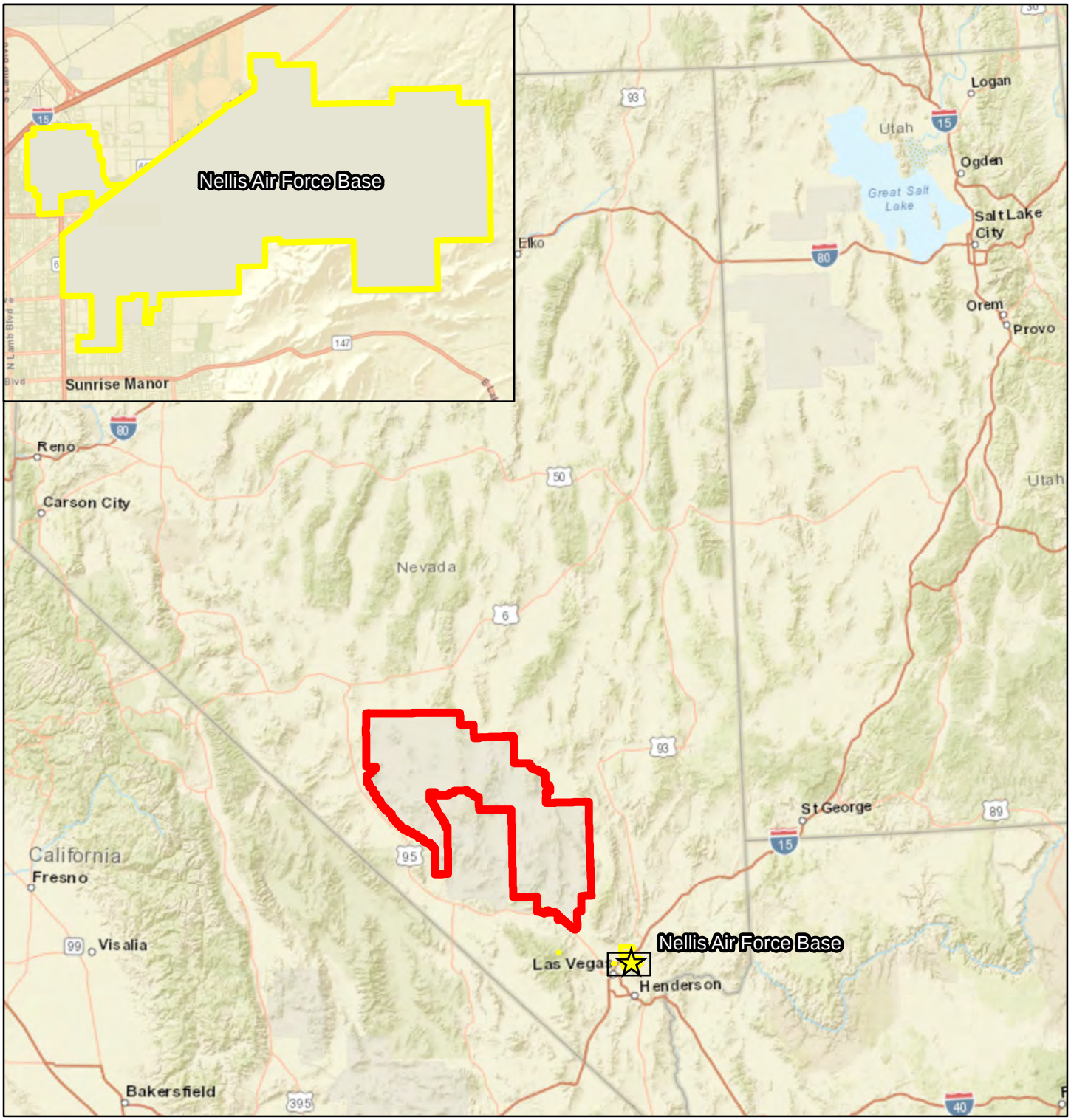
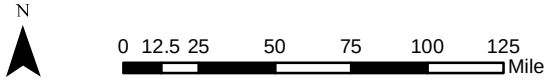


FIGURE 1-1
Regional Overview

Installation Boundary

Nevada Test and Training Range



Imagery: ESRI, 2021
Coordinate System: NAD 83 UTM Zone 14N

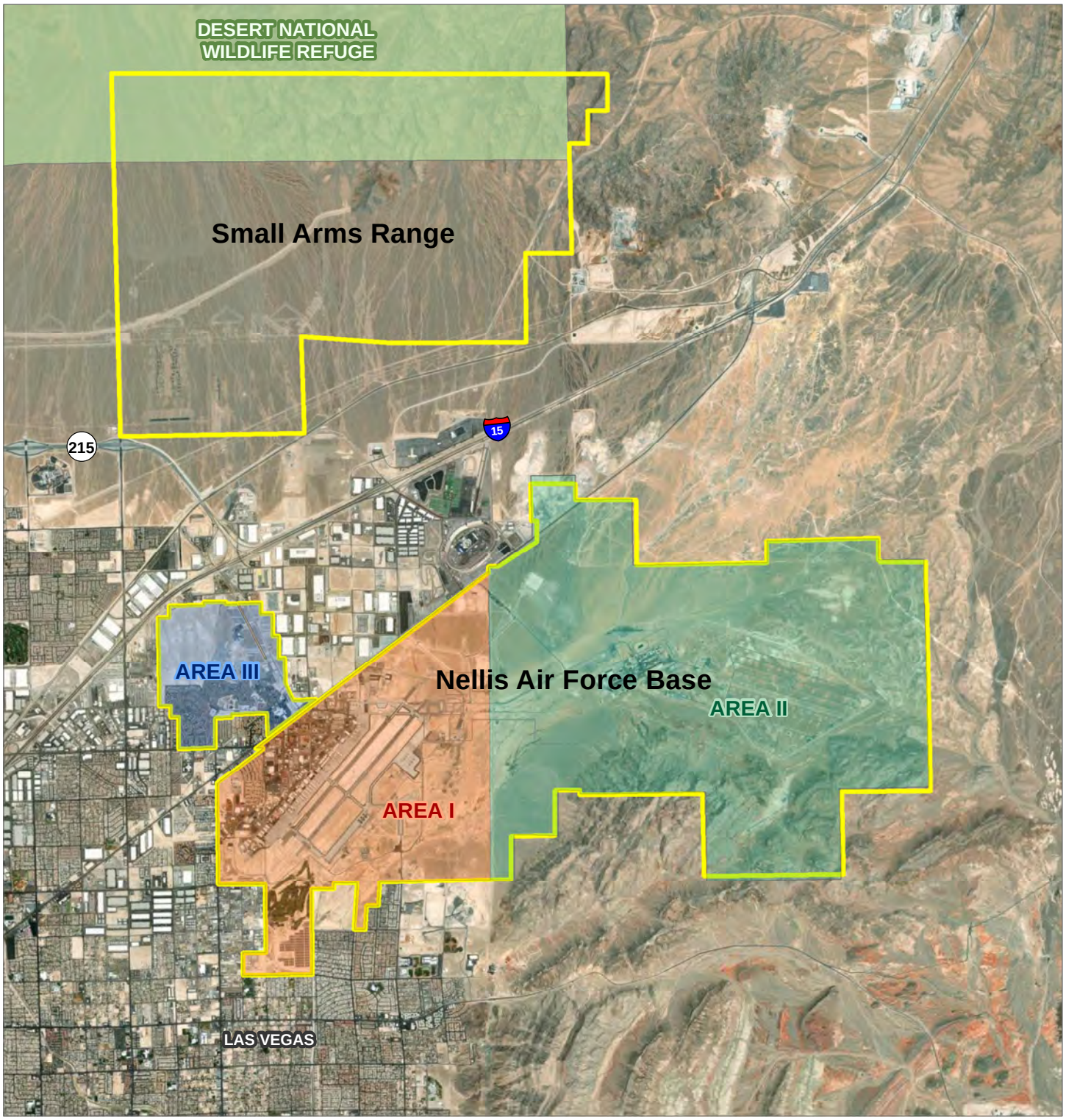


FIGURE 1-2
Nellis AFB Aerial Overview

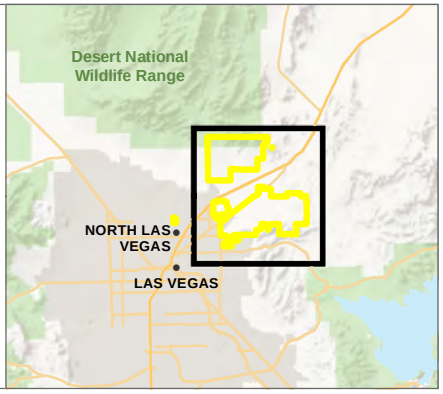
Installation Boundary

Desert National Wildlife Refuge

N

0 1.25 2.5 Miles

Imagery: ESRI, 2021.
Coordinate System: NAD 83 UTM Zone 11N



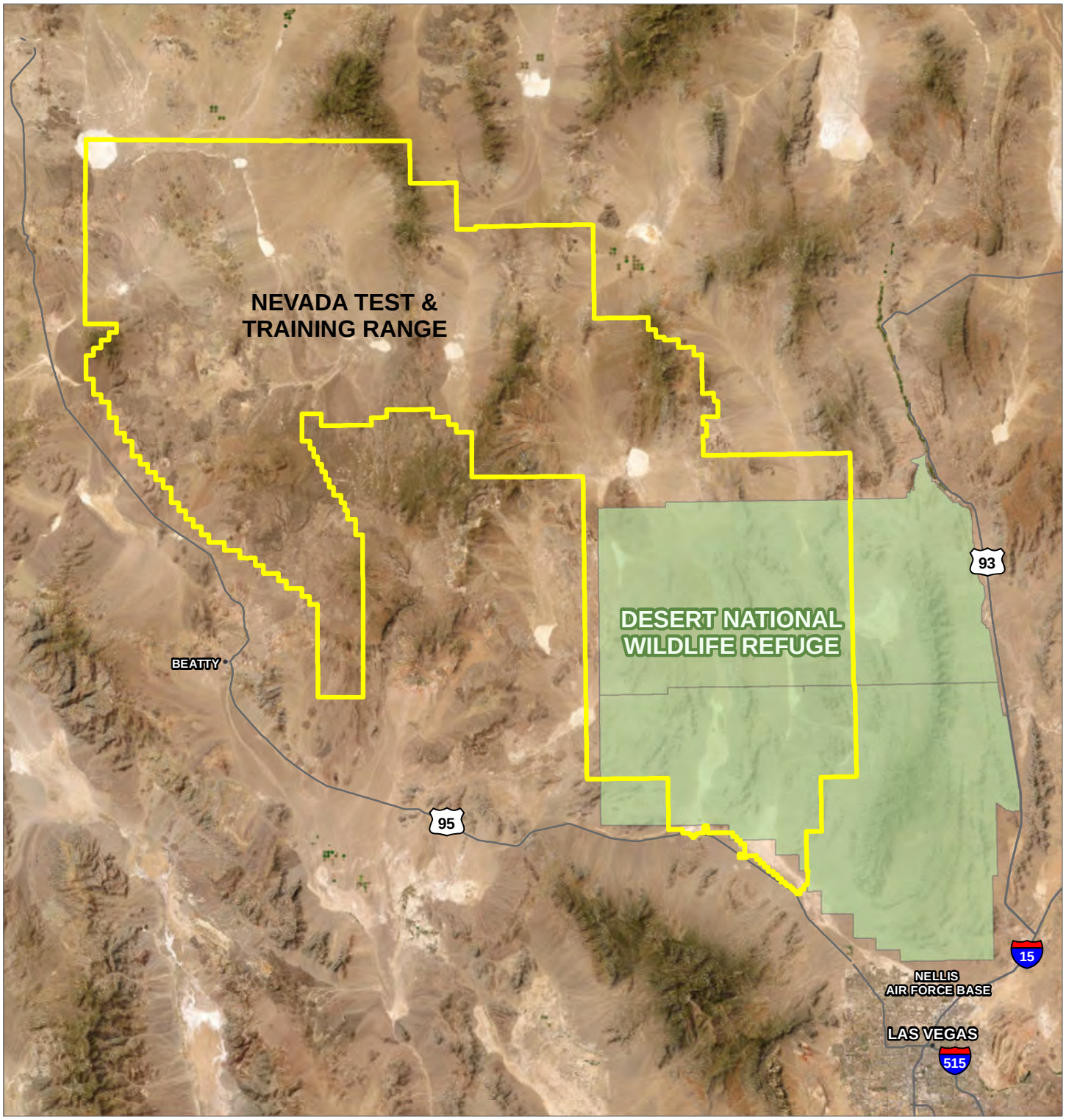


FIGURE 1-3
NTTR Aerial Overview

Nevada Test and Training Range

Desert National Wildlife Refuge

N

0 15 30 Miles

Coordinate System: NAD 83 UTM Zone 11N

projects occurring on the installations and ensures that natural resources are considered during planning, site selection, and decision-making processes.

1.4 Scope of the Environmental Assessment

The Air Force NEPA regulations at 32 CFR § 989.11 require an assessment of potential environmental impacts for Air Force projects recommended in a comprehensive plan such as an INRMP. In accordance with 40 CFR § 1501.3, the Air Force determined the appropriate level for this analysis is an EA.

This EA will evaluate the potential environmental consequences of implementing the Proposed Action and Alternatives for INRMP projects at Nellis AFB and the NTTR. Consistent with the CEQ regulations, the EA is organized into the following sections:

- Chapter 1, Purpose and Need for Action, includes an introduction and information on the project location, purpose and need statements, scope of environmental analysis, intergovernmental coordination, public and agency participation, decision to be made, and a list of applicable laws and environmental regulations.
- Chapter 2, Description of the Proposed Action and Alternatives, includes a detailed description of the Proposed Action, alternative selection standards, a description of the selected alternatives, and a summary of potential environmental consequences.
- Chapter 3, Affected Environment and Environmental Consequences, includes a description of the natural and man-made environments within and surrounding Nellis AFB and the NTTR that may be affected by the Proposed Action and No Action Alternative. This chapter also includes a discussion of direct and indirect impacts.
- Chapter 4, List of Preparers, provides a list of the preparers of this EA.
- Chapter 5, References, contains references for studies, data, and other resources used in the preparation of this EA.
- Appendices, as required, provide relevant correspondence, studies, modeling results, and public review information.

NEPA, which is implemented through the CEQ regulations, requires federal agencies to consider alternatives to the Proposed Action and to analyze potential impacts of alternative actions. Potential impacts of the Proposed Action and Alternatives described in this EA will be assessed in accordance with the CEQ regulations, which require that federal agencies analyze the potentially affected environment and degree of the effects of the action**.**

1.5 Intergovernmental Coordination, Public and Agency Participation

The EIAP, in compliance with NEPA guidance, includes public and agency review of information pertinent to a proposed action and alternatives. The Air Force's compliance with the requirement for intergovernmental coordination and agency participation begins with the scoping[2] process (40 CFR § 1501.9). Accordingly, and per EO 12372, *Intergovernmental Review of Federal Programs*, the Air Force notified federal, state, and local agencies and tribal governments with jurisdiction that could potentially be affected by the Proposed Action and Alternatives via written correspondence throughout the development of this EA. A mailing list of the recipients of this correspondence as well as a sample of the outgoing letters and all responses are included in **Appendix A**.

1.5.1 Government-to-Government Consultation

The *National Historic Preservation Act* (54 USC § 300101 et seq.) (NHPA) and its regulations at 36 CFR Part 800 direct federal agencies to consult with federally recognized Indian tribes when a proposed action or alternatives may have an effect on tribal lands or on properties of religious and cultural significance to a tribe. Consistent with the NHPA, the *Native American Graves and Protection and Repatriation Act* (25 USC

[2] Scoping is a process for determining the extent of issues to be addressed and analyzed in a NEPA document.

§ 3001 et seq.), DoDI 4710.02, *Interactions with Federally Recognized Tribes*, and Department of the Air Force Instruction (AFI) 90-2002, *Air Force Interaction with Federally Recognized Tribes*, the Air Force has invited federally recognized tribes that are historically affiliated with lands in the vicinity of the Proposed Action and Alternatives to consult on all proposed undertakings that have a potential to affect properties of cultural, historical, or religious significance to the tribes. The tribal consultation process is distinct from the NEPA consultation process and requires separate notification to all relevant tribes. The timelines for tribal consultation are also distinct from those of NEPA consultation. The Nellis AFB point of contact for Indian tribes is the Base Commander. The point of contact for consultation with the Tribal Historic Preservation Officer and the Advisory Council on Historic Preservation is the Nellis AFB Cultural Resources Manager. A mailing list of the tribal government recipients of this invitation as well as a sample of the outgoing correspondence and all responses are included in **Appendix A.**

1.5.2 Agency Consultations and Coordination

Implementation of the Proposed Action involves coordination with several organizations and agencies. Compliance with Section 7 of the *Endangered Species Act of 1973*, as amended (16 USC §§ 1531–1544) (ESA), and implementing regulations (50 CFR Part 402) requires communication with the US Fish and Wildlife Service (USFWS). The Air Force coordinated with the USFWS on the INRMP project list to identify and compile a comprehensive ESA species list. The list identifies threatened and endangered species and other protected species (e.g., migratory birds) with potential to be affected by the Proposed Action. This topic is discussed in **Section 3.8.2.3** of this EA.

Other federal agencies the Air Force might coordinate with include the US Environmental Protection Agency (USEPA), Bureau of Land Management (BLM), US Geological Survey (USGS), National Park Service, and US Forest Service.

The Air Force coordinated with the following state and local government agencies regarding potential effects from the Proposed Action and Alternatives:

- NHPA Section 106 compliance–State Historic Preservation Office
- Air and water quality effects–Nevada Department of Environmental Protection (NDEP) and Clark County Department of Environment and Sustainability
- Forestry–Nevada Division of Forestry
- Habitat and species of concern–Nevada Department of Wildlife (NDOW)

Finally, notice of the Proposed Action and Alternatives was provided to elected officials that represent the state at the federal and local levels. A sample of agency correspondence and all responses are included in **Appendix A**.

1.5.3 Public and Agency Review

The Air Force invited the tribes, the public, and other interested stakeholders to review and comment on the Draft EA. Accordingly, a Notice of Availability of the Draft EA and Draft FONSI was published in the following local newspapers to commence a 30-day public comment period.

- *Las Vegas Review Journal*
- *Desert Lightning News*

The public comment period of the Draft EA and FONSI concluded on 21 March 2024. During the public comment period, the Draft EA and Draft FONSI were available online for viewing or download at https://www.nellis.af.mil/Public-Affairs/Community-Engagement/Partnerships/Environment/. Additionally, printed copies of the Draft EA and Draft FONSI were available by request and placed at the following area libraries for review:

- Sunrise Library, 5400 E Harris Ave, Las Vegas, NV 89110
- Alexander Library, 1755 W Alexander Rd, North Las Vegas, NV 89032

The Air Force received comments from one agency, NDOW, a copy of which is included in **Appendix A**.

1.6 DECISION TO BE MADE

The decision to be made is whether to implement the Proposed Action. Should the Air Force choose to implement the Proposed Action, this EA will assist in determining an appropriate scope of action to minimize potential adverse environmental impacts and allow for additional, project-specific environmental review in compliance with NEPA. The decision-making framework for this EA (see also **Section 3.1**) is described as follows:

- Choose the Proposed Action and sign a FONSI, allowing implementation of the selected alternative;
- Initiate preparation of an Environmental Impact Statement if it is determined that significant impacts would occur through implementation of the Proposed Action; or
- Select the No Action Alternative, whereby the Proposed Action would not be implemented.

Should the Air Force decide to implement the Proposed Action as noted above, this EA will identify any actions the Air Force will commit to undertake to minimize environmental effects and comply with NEPA.

1.7 APPLICABLE LAWS AND ENVIRONMENTAL REGULATIONS

Other laws and regulations applicable to the Proposed Action include, but are not limited to:

- *Endangered Species Act* (16 USC § 1531 et seq.) (ESA)
- *National Invasive Species Act of 1996 (16 USC § 4701 et seq.)*
- *Wild Free-Roaming Horses and Burros Act (16 USC § 1331–1340)*
- *Bald and Golden Eagle Protection Act* (16 USC § 668–668d) (BGEPA)
- *Clean Water Act* (33 USC § 1251 et seq.) (CWA)
- Resource Conservation and Recovery Act (42 USC § 6901 et seq.)
- Section 438 of the *Energy Independence and Security Act* (Public Law 110-140)
- Comprehensive Environmental Response, Compensation, and Liability Act (42 USC § 9601 et seq.)
- Federal *Clean Air Act* (42 USC § 7401 et seq., as amended) (CAA)
- *Migratory Bird Treaty Act* (16 USC § 703–712) (MBTA)
- Toxic Substances Control Act (15 USC § 2601 et seq.)
- EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (1994)
- EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks* (1997), as amended by EO 13296 (2003)
- EO 14096, *Revitalizing Our Nation's Commitment to Environmental Justice for All* (2023)

CHAPTER 2 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The following sections describe the Proposed Action, alternatives screening process, and alternatives retained for analysis in this EA.

2.1 INTRODUCTION

The INRMP projects included as part of the Proposed Action were selected based on current and future needs at Nellis AFB and the NTTR associated with natural resources and ecosystem management. Each of the proposed projects would support the overall purpose and need for the Proposed Action as outlined in **Section 1.3.**

2.2 DESCRIPTION OF THE PROPOSED ACTION

The Proposed Action includes natural resource management projects on Nellis AFB and the NTTR that align with established INRMP goals and objectives (see **Section 2.2.1**). These projects would include, but not be limited to, conducting survey work for identified taxa; installing and maintaining equipment such as cameras and acoustic monitors; treating invasive plant species with approved herbicides; monitoring water parameters; trapping and releasing species according to state and federal permit requirements; conducting habitat restoration projects for the benefit of special-status species; installing and monitoring exclusionary fences around sensitive areas; maintaining permits for flight safety; conducting hazardous fuel reduction projects to reduce the threats of wildland fire; updating the Natural Resources Management Database to inform management decisions; and conducting educational outreach.

The Nellis Natural Resources Program has established long-term goals, objectives, and projects for the management and protection of natural resource assets integral to carrying out the military mission. The proposed INRMP projects are categorized under these goals (listed below), each with a set of objectives and list of projects that support their achievement.

2.2.1 List of Proposed Projects Categorized by Goals and Objectives

GOAL 1: Ensure long-term wildlife and ecosystem viability on Nellis AFB and the NTTR in support of the military mission by conducting targeted surveys and monitoring for threatened, endangered, and sensitive species.

OBJECTIVE 1.1—Continue to survey and monitor for Mojave desert tortoise (*Gopherus agassizii)* populations using methods approved by the USFWS and existing Biological Opinions with consideration of projected increasing temperatures and changing precipitation.

- **Project 1.1.1–**Conduct up to 40 field days of surveys for Mojave desert tortoise on Nellis AFB and the NTTR, including up to 6 days of helicopter use for accessing remote areas that cannot be reached by road.

- **Project 1.1.2–**In addition to the 40 field days planned in Project 1.1.1, expand existing Mojave desert tortoise surveys to include tortoise health assessment measurements, DNA sample collection and analysis, use of very high-frequency radio transmitters and shell-attached global positioning system (GPS) loggers, and application of unique identification tag, as approved by USFWS.

OBJECTIVE 1.2—Conduct surveys to support management of golden eagles and inform management decisions.

- **Project 1.2.1–**Conduct up to 8 days of helicopter surveys for nesting golden eagles on the NTTR.

- **Project 1.2.2–**Conduct up to 8 days of prey-base surveys on the NTTR such that each survey route is covered twice in the course of the year, once in the spring and once in the fall, to fully capture the prey base availability throughout the year.

- **Project 1.2.3–**Determine feasibility and utility of attaching GPS transmitters to golden eagle chicks through collaboration with USFWS to inform regional knowledge of eagle movements on and off of the NTTR.

OBJECTIVE 1.3—Survey and monitor migratory birds to document biodiversity and inform management decisions.

- **Project 1.3.1–**Conduct up to 10 burrowing owl surveys on the NTTR.
- **Project 1.3.2–**Conduct up to 30 stationary point counts on Nellis AFB and the NTTR.
- **Project 1.3.3–**Survey up to 3 days for wintering raptors on the North Range of the NTTR.
- **Project 1.3.4–**Conduct up to 4 days of winter powerline surveys for raptors.
- **Project 1.3.5–**Conduct up to 8 call playback surveys for burrowing owls or other sensitive bird species.
- **Project 1.3.6–**Collaborate with the Partners in Flight Pinyon Jay Working Group to establish a pinyon jay survey protocol to be implemented annually.

OBJECTIVE 1.4—Conduct focused surveys and monitoring on state-sensitive fauna and Base-defined candidate species to inform management and future listing decisions.

- **Project 1.4.1–**Conduct 30 surveys of established transects for the Mojave fringe-toed lizard and collect genetic samples from passive integrated transponder (PIT) or elastomer tagged lizards.
- **Project 1.4.2–**Collaborate with NDOW/USGS to conduct genetic analyses of the Mojave fringe-toed lizard genetic sampling.
- **Project 1.4.3–**Monitor nesting burrowing owls on Nellis AFB using up to 50 half days. Investigate usage of wildlife cameras to monitor nesting burrowing owls.
- **Project 1.4.4–**Annually conduct up to 4 days of call playback surveys for burrowing owls on Nellis AFB.
- **Project 1.4.5–**Annually conduct up to 4 days of call playback surveys for burrowing owls on the NTTR.
- **Project 1.4.6–**Conduct up to 4 days of color-banding burrowing owls on Nellis AFB. Banding will allow for identification of individual owls and year-to-year monitoring. Investigate different trapping techniques to increase capture rate. Collect genetic samples while banding owls and provide to the USFWS for analysis.
- **Project 1.4.7–**Using data collected in Project 1.4.6 and previous data collection efforts, develop a burrowing owl management plan.
- **Project 1.4.8–**Determine feasibility and utility of banding LeConte's and Bendire's thrashers to obtain further information on population demographics and aid in protection and management.
- **Project 1.4.9–**Annually survey known populations of the Las Vegas bearpoppy for the Mojave poppy bee, a potential candidate species for federal listing. Share any relevant data with USFWS to inform listing decisions.
- **Project 1.4.10–**Expand monitoring for the Mojave poppy bee at *Argemone munita* locations.

- **Project 1.4.11–**Conduct surveys for the management of the western bumble bee.

- **Project 1.4.12–**Survey for milkweeds on Nellis AFB and the NTTR to monitor for monarch activity and habitat. Provide observations to the Western Monarch Milkweed Mapper (https://www.monarchmilkweedmapper.org/).

- **Project 1.4.13–**Identify locations on the Base where milkweed could be planted, as described in the Best Management Practices (BMPs) developed for the DoD. Consider locations where monarch activity could be used for educational and outreach purposes, potentially including tagging.

- **Project 1.4.14–**Conduct up to 4 sessions of small mammal live-trapping, with a focus on Species of Greatest Conservation Need (SGCN), where one session is a minimum of 3 nights/4 days with 400 traps open each night, on Nellis AFB and the NTTR. Collect genetic samples for captured individuals to be analyzed in collaboration with NDOW. Collect vegetation data concurrently within the plots to quantify changes in response to a changing climate.

- **Project 1.4.15–**Conduct surveys to document indirect impacts of wild horses and burros on small mammal communities through measurements of soil and vegetation.

OBJECTIVE 1.5—Survey and monitor the bat communities on Nellis AFB and the NTTR to determine presence and abundance parameters to inform management decisions.

- **Project 1.5.1–**Conduct up to 5 mist-netting sessions at appropriate habitats on Nellis AFB, and band SGCN per an NDOW Scientific Collection permit.

- **Project 1.5.2–**Deploy and monitor up to 4 acoustic recording devices in appropriate habitats around Nellis AFB and the SAR. Recorders will be left out year-round to monitor changes in bat populations, activity levels, and diversity.

- **Project 1.5.3–**Conduct up to 10 mist-netting sessions at appropriate habitats on the NTTR, and wing-band SGCN per an NDOW Scientific Collection permit.

- **Project 1.5.4–**Deploy and monitor up to 16 acoustic recording devices at appropriate habitats across the NTTR. Recorders will be left out year-round to monitor changes in bat populations, activity levels, and diversity, which includes acoustic monitors to support the USGS North American Bat Monitoring Program[3] monitoring grid locations for up to 2 weeks on the NTTR.

OBJECTIVE 1.6—Monitor for sensitive plant species to inform future management and protection.

- **Project 1.6.1–**Continue annually revisiting historically recorded sensitive plant locations on Nellis AFB and the NTTR.

- **Project 1.6.2–**Record GPS points of sensitive plant species discovered incidentally to other surveys to help focus future survey areas on Nellis AFB and the NTTR.

- **Project 1.6.3–**Annually assess Las Vegas bearpoppy, Las Vegas buckwheat, and other rare plants on monitoring plots and other potential locations based on species distribution models of projected suitable habitat on Nellis AFB.

OBJECTIVE 1.7—Continue to monitor and conserve bighorn sheep on the NTTR to sustain populations and support stakeholder management efforts.

[3] The North American Bat Monitoring Program uses multiple lines of evidence to understand where, when, and how bat populations change over time.

- **Project 1.7.1–**Use photos taken by remote cameras to determine the presence or absence of bighorn sheep and inform knowledge of population size and demographics. Screen photos for disease detection.

- **Project 1.7.2–**Conduct at least 3 days of helicopter surveys for bighorn sheep in the fall on the North Range of the NTTR every other year.

- **Project 1.7.3–**Plan and implement bighorn sheep collaring projects in collaboration with NDOW to determine the basic ecology, movements, and level of connectivity between different subpopulations.

- **Project 1.7.4–**Collaborate with NDOW and USFWS to conduct disease and health surveillance monitoring on bighorn sheep for evaluation and removal of infected sheep.

- **Project 1.7.5–**Collaborate with outside partner agencies (e.g., USFWS, BLM, NDOW, and USGS) to collar the desert bighorn sheep range herd (possibly 2 herds north and south) and plan for collar purchase/refurbishment (22 collars); satellite service; and staff time for collar collection, monthly data download, data analysis and report development. This effort will require 1 helicopter day for support.

- **Project 1.7.6–**Collaborate with NDOW and USFWS to analyze data for all collaring efforts (e.g., movement analysis, seasonal/daily usage, health assessments, lambing areas, and habitat connectivity) to develop posters, presentations, and reports and inform Air Force and NDOW sheep management.

OBJECTIVE 1.8—Install and maintain wildlife motion sensor cameras and weather data collection instruments at water sources to monitor and document biodiversity and use.

- **Project 1.8.1–**Place up to 15 wildlife cameras annually at water sources throughout the NTTR, and plan for a total of 8 helicopter days to collect secure digital cards and maintain cameras.

- **Project 1.8.3–**Where feasible, install data logger-connected precipitation gauges and temperature sensors at wildlife camera sites to understand microclimate effects and track changes in temperature and precipitation.

OBJECTIVE 1.9—Inventory and monitor populations of herpetofauna, pronghorn, mesocarnivores, invertebrates, and mollusks for population trends and biodiversity to inform management decisions.

- **Project 1.9.1–**Conduct up to 25 days of diurnal Visual Encounter Surveys for herpetofauna, including snake den checks and cover board checks.

- **Project 1.9.2–**Conduct up to 10 nights of nocturnal Visual Encounter Surveys.

- **Project 1.9.3–**Conduct up to 35 nights of road cruising for herpetofauna.

- **Project 1.9.4–**Conduct up to 5 days of equipment set-up/take-down for cover boards, song meters, PIT tag readers, and the like.

- **Project 1.9.5–**Deploy up to 6 acoustic recording devices at different water sources on the NTTR to document amphibians.

- **Project 1.9.6–**Conduct visual inspections for snake fungal disease for snakes encountered during surveys, and swab non-venomous individuals for further testing under the DoD Legacy project.

- **Project 1.9.7–**Conduct up to 4 days of helicopter surveys for pronghorn in the summer on the NTTR.

- **Project 1.9.8–**Conduct up to 4 sessions of live-trapping mesocarnivores, where one session is 3 nights/4 days on Nellis AFB and the NTTR.

- **Project 1.9.9–**Expand camera-trapping efforts to include installing 8 scent stations at camera-trapping locations to attract mesocarnivores.

- **Project 1.9.10–**Coordinate with the Utah and Nevada Spring Snail Conservation Team to implement snail surveys at suitable locations on the NTTR.

- **Project 1.9.11–**Conduct environmental DNA analyses to determine species of tadpoles observed on the west slope of the Kawich mountains.

- **Project 1.9.12–**Initiate localized survey of insect diversity and abundance to inform knowledge of invertebrate biodiversity and support insectivorous bats.

- **Project 1.9.13–**Collaborate with NDOW and USGS to collect soil samples from playa beds to determine the presence of fairy shrimp on the NTTR.

GOAL 2: Sustain and protect sensitive plant and animal species and natural habitats to support the military mission and preserve biodiversity in a changing climate.

OBJECTIVE 2.1—Avoid impacts to threatened, endangered, and sensitive species and communities.

- **Project 2.1.1–**Maintain comprehensive species lists depicting and describing species locations, population status, native status, regulatory status, rarity, and historical documentation to assist the Air Force in identifying sensitive and protected species, habitats, and communities and directives for conforming to environmental regulations governing those resources.

- **Project 2.1.2–**Evaluate feasibility of retrofitting powerline features dangerous to raptors on the NTTR, removing raptor nests perched on dangerous powerline features, and erect alternative replacement nest perches.

- **Project 2.1.3–**Reduce foot and vehicle traffic in areas with known Las Vegas bearpoppy populations to protect the plant and its host, the Mojave poppy bee, which are both in review for listing under ESA.

OBJECTIVE 2.2—To comply with requirements of ESA Section 7(a)(2)c, monitor Mojave desert tortoise distribution and density within Nellis AFB and the NTTR.

- **Project 2.2.1–**Establish monitoring programs by designating areas of Mojave desert tortoise habitat on Nellis AFB and the NTTR. Design a survey schedule capable of identifying changes in density and distribution within these areas.

- **Project 2.2.2–**Within the scope of the biological assessment, quantify potential local impacts to Mojave desert tortoise populations before military activities are implemented.

- **Project 2.2.3–**Conduct Mojave desert tortoise education for military personnel as needed or requested. Expand Mojave desert tortoise awareness materials and disseminate an annual Mojave desert tortoise vehicle collision alert via email during high Mojave desert tortoise movement periods.

- **Project 2.2.4–**Reseed up to 100 acres annually with native seed to restore Mojave desert tortoise habitat.

- **Project 2.2.5–**In the next 5 years, review and update the 2015 desert tortoise management guidelines.

- **Project 2.2.6–**In the next 5 years, develop, produce, and install road signage for tortoise caution signs and speed limit signs.

- **Project 2.2.7–**To exclude tortoises from areas with military activities, install exclusionary fencing at new developments and expand the fencing at the rock quarry.

OBJECTIVE 2.3—Comply with the MBTA and ESA.

- **Project 2.3.1–**Conduct 35 days of pre-project surveys to detect Mojave desert tortoise and nesting birds and conduct construction monitoring for Mojave desert tortoise on Nellis AFB.

- **Project 2.3.2–**Conduct 15 days of pre-project surveys to detect Mojave desert tortoise and nesting birds and conduct construction monitoring for Mojave desert tortoise on the NTTR.

- **Project 2.3.3–**Inspect Mojave desert tortoise fencing in accordance with the Biological Opinion and promptly conduct repairs as needed.

OBJECTIVE 2.4—Conduct cleanup and remediation of areas that are critical to protected-species habitat and wildlife corridors.

- **Project 2.4.1–**Conduct habitat restoration on a case-by-case basis after events, such as wildfires, crashes, chemical spills, and discontinued active use of sites.

- **Project 2.4.2–**Install, maintain, and monitor exclusionary fences around springs and seeps used by wild horses and burros to preserve access to these resources for native species.

- **Project 2.4.3–**Conduct cleanup of trash and refuse within fenced Area III Conservation Area.

OBJECTIVE 2.5—Monitor and maintain the protected Area III Conservation Area on Nellis AFB to continue to protect populations of Las Vegas bearpoppy, Las Vegas buckwheat, and other sensitive or rare plant species.

- **Project 2.5.1–**Determine a conservation strategy to monitor and sustain documented occurrences populations of Las Vegas bearpoppy, Las Vegas buckwheat, and other sensitive or rare plant species.

OBJECTIVE 2.6—Assess and mitigate impact of disturbance on vegetation communities, demonstrating mitigation effectiveness (including restoration) in short, medium, and long time periods.

- **Project 2.6.1–**Update and refine GIS and maps, and address data gaps with sampling efforts on NDOW key habitats.

- **Project 2.6.2–**Implement post-mitigation monitoring protocols that assess specific metrics of success such as proportion of native and non-native species cover, native species recruitment, usage by native animal species, and erosion. Determine appropriate monitoring intervals based on the type of disturbance, restoration or mitigation practices used, and ecological site conditions to inform management and adapt mitigation protocols.

- **Project 2.6.3–**Identify areas of the NTTR with no further plans for active use, such as roads and two-tracks and areas infested with invasive species, that could be restored to desert tortoise habitat or reduce wildfire risk.

OBJECTIVE 2.7—Conduct vegetation classification and ground-truthing surveys during appropriate survey windows according to nationally recognized standards to improve accuracy and utility of vegetation and habitat maps and track changes in vegetation as temperatures increase and precipitation decreases.

- **Project 2.7.1–**Delineate and classify up to 25,000 acres on the NTTR, annually.
- **Project 2.7.2–**Summarize and update NDOW key habitats known to occur on the NTTR.
- **Project 2.7.3–**Conduct up to 30 days of vegetation classification on the NTTR, 8 of which may require the use of a helicopter to access remote sites.
- **Project 2.7.4–**Determine the feasibility and utility of using software programs to annually delineate vegetation classifications to show annual changes caused by variable precipitation and increasing temperatures.
- **Project 2.7.5–**Determine the feasibility and utility of incorporating the BLM Assessment, Inventory, and Monitoring strategy for long-term vegetation monitoring plots into the NTTR vegetation monitoring program.
- **Project 2.7.6–**Survey pinyon pine to increase understanding of food and habitat resources for pinyon-dependent wildlife species including the pinyon jay.

OBJECTIVE 2.8—Monitor water parameters of seep and spring locations on the Base to assess presence/absence of water at historical springs, document field conditions, and assess forage opportunities and water availability for native wildlife.

- **Project 2.8.1–**Conduct 8 days of surveys over a 7-year cycle to perform wetland delineations and, where possible, complete testing of water parameters (e.g., pH, temperature, conductivity, sampling depth, dissolved oxygen, salinity) and hydrological status at seeps and springs across the NTTR. Up to 6 days of helicopter surveys may be needed to access remote areas.
- **Project 2.8.2–**Conduct a study of groundwater sources on the NTTR to better describe and quantify continued water availability for native wildlife in a changing climate.
- **Project 2.8.3–**Install soil moisture sensors and conduct ongoing soil moisture monitoring, compiling monthly and annual trends to compare with results of ongoing vegetation classification surveys, particularly in wetland and spring/springbrook areas to better understand moisture regimes and to better track losses/impacts to these valuable habitats under a changing climate.

OBJECTIVE 2.9—Monitor and control invasive plant species populations for early detection and eradication or sustained treatment efforts to comply with EO 13112, *Invasive Species*, and EO 13751, *Safeguarding the Nation from the Impacts of Invasive Species*.

- **Project 2.9.1–**Annually survey up to 400 acres, over approximately 8 days for invasive plant species on the NTTR. Monitor areas of previous invasive species treatment to plan for future removal projects in case of regrowth (approximately 20 acres).
- **Project 2.9.2–**Annually conduct up to 4 days of surveys for invasive plant species, covering approximately 200 acres on Nellis AFB.
- **Project 2.9.3–**Apply pre-emergent herbicide to Bromus species infestations on the NTTR.
- **Project 2.9.4–**Apply herbicides to the road network between Tolicha Peak and Black Mountain to reduce invasive annual grass and to create a fire break to slow or stop the movement of fire in this fire-prone region.

- **Project 2.9.5–**Annually treat invasive Sahara mustard, tamarisk, or other non-native invasive species on Nellis AFB Area II, on Nellis Water System Annex, and other sites on Nellis AFB.

- **Project 2.9.6–**Continue the pilot study of treating cheatgrass infestations with a carbon source, to include the effectiveness of the method and long-term effects on vegetation and carbon cycling. If feasible, conduct acres of additional treatments annually. Develop cost analysis of treatment method to include planning and implementation manpower costs, as well as materials.

- **Project 2.9.7–**Survey roadsides and borrow pits for the Malta star thistle on Nellis AFB (approximately 250 acres).

OBJECTIVE 2.10—Monitor for non-native, feral, and potentially invasive animal and pest species to ensure early detection of northward or upward range shifts and new introductions.

- **Project 2.10.1–**Continue to monitor non-native gecko populations incidental to other herpetological work, and work with partners to determine if control work is necessary and feasible.

- **Project 2.10.2–**Work with BLM partners to document damage to soils, vegetation, and water resources from wild horses and burros, and determine feasible strategies to mitigate the negative effects to native species.

OBJECTIVE 2.11—Improve natural resources education and quality of life by providing educational opportunities and outdoor recreation sites that also sustain biodiversity.

- **Project 2.11.1–**Develop an environmental appreciation park in the Area III Conservation Area for Base residents to benefit the long-term protection of rare plants and other species. This park will provide public access by construction of an elevated boardwalk that protects soils and vegetation while providing walking, jogging, and biking opportunities. This will be enhanced with railings and shaded picnic areas.

- **Project 2.11.2–**Develop a simple pollinator monitoring survey that can be conducted by the public in an annual "Bioblitz" to raise awareness of the DoD's commitment to supporting pollinators and the Presidential Memorandum, *Creating a Federal Strategy to Promote the Health of Honeybees and Other Pollinators* (Volume 79 of the *Federal Register*, page 35903, 24 June 2014). Coordinate timing of Bioblitz with events such as monarch migration and/or key floral blooming periods and distribute educational materials such as those found through the Pollinator Partnership.

- **Project 2.11.3–**Maintain and enhance the Nellis AFB Tree City USA recognition by continuing urban forestry initiatives, including maintenance of the tree inventory, development of an urban forestry plan, and working with the Nevada Department of Forestry to acquire and plant landscaping trees along walkways and common areas.

GOAL 3: Maintain compliance with federal, state, local, and military regulations.

OBJECTIVE 3.1—Maintain required federal, state, and local plans and permits, such as the INRMP, Wildland Fire Management Plan, Bird/wildlife Aircraft Strike Hazard (BASH) Plan, and Integrated Pest Management Plan, and associated permits.

- **Project 3.1.1–**Ensure all installation development and survey/monitoring protocols follow current Programmatic Biological Opinion requirements and guidance.

- **Project 3.1.2–**Maintain a Wildland Fire Management Plan and review the Memorandum of Understanding with cooperators for fire suppression assistance.

- **Project 3.1.3–**Obtain and maintain state and federal permits for INRMP goals, objectives, projects, and permits to support BASH.

- **Project 3.1.4–**Collaborate with 57th Wing Flight Safety to share avian point-count data and BASH bird fatalities information.

- **Project 3.1.5–**Conduct NEPA for federal depredation permit implementation.

OBJECTIVE 3.2—Maintain interdepartmental and interagency cooperation (e.g., planning, meeting, data sharing) to ensure protocols are followed and to avoid work redundancy.

- **Project 3.2.1–**Collaborate with NDOW for annual desert bighorn sheep surveys.

- **Project 3.2.2–**Collaborate with external agencies (NDOW, USFWS, and USGS) for complex monitoring projects of desert bighorn sheep to verify and characterize environmental relationships on and beyond the NTTR regarding population and habitat connectivity, establish and maintain population health profiles and population trends, and to finalize a robust predictive habitat-use model based in part on spatial and temporal habitat-use patterns.

- **Project 3.2.3–**Collaborate with the USFWS on management activities for desert bighorn sheep on the South Range of the NTTR so that management activities are as compatible as is practical and possible with the DNWR Comprehensive Conservation Plan and the Sheep Management Plan.

- **Project 3.2.4–**Collaborate with the BLM on surveys for wild horses and vegetation utilization, which may be done in conjunction with other annual surveys. Conduct rangeland utilization surveys to inform horse and burro management to protect vegetation and water/riparian resources and preserve these for use by native species.

- **Project 3.2.5–**Consult the BLM invasive species specialist before initiating any invasive species control projects on the North Range of the NTTR. Coordinate with the USFWS before initiating any invasive species control projects on the South Range of the NTTR. Any herbicides used shall be reviewed for pollinator impacts following the *Air Force Pollinator Conservation Strategy and Reference Guide* (USFWS, 2017).

- **Project 3.2.6–**Conduct biannual meetings with natural resources managers and the Pest Management Office to increase communication and support mutually beneficial on-Base pest management actions.

- **Project 3.2.7–**Develop and maintain collaborative relationships with federal and state agencies, as well as non-governmental organizations such as Partners in Flight, Great Basin Bird Observatory, Partners in Amphibian and Reptile Conservation, and various agency-sponsored working groups, such as the Desert Tortoise Management Oversight Group and the Joshua Tree Working Group, to standardize avian surveying and monitoring protocols, contribute to the greater knowledge of bird species occurring on Base, and to increase the capacity for effective habitat management and good stewardship of these bird species across their ranges.

- **Project 3.2.8–**Coordinate with seed collection organizations to collect representative seed samples of plant species found on the NTTR to stabilize, rehabilitate, and restore degraded land.

GOAL 4: Protect life, property, and resources from wildfire at costs commensurate with values at risk.

OBJECTIVE 4.1—Reduce hazardous fuels around infrastructure and in strategic locations to reduce the potential impact of wildfire.

- **Project 4.1.1–**Reduce the threat of wildfire to the Cedar Peak power line infrastructure by treating up to 150 acres of hazardous fuel accumulation.

- **Project 4.1.2–**Reduce the threat of wildfire to Black Mountain by treating up to 150 acres of hazardous fuel accumulation.

- **Project 4.1.3–**Reduce the threat of wildfire to Stonewall by treating up to 20 acres of hazardous fuel accumulation.

- **Project 4.1.4–**Reduce the threat of wildland fire to Belted Peak by treating up to 20 acres of hazardous fuel accumulation.

- **Project 4.1.5–**Use herbicides to treat roadsides with invasive grasses to create firebreaks.

- **Project 4.1.6–**Coordinate wildland fire and invasive species initiatives to reduce large-scale infestations of Bromus species to decrease wildfire risks, especially in the Tolicha Peak Electronic Combat Range and Range R77 within the NTTR.

- **Project 4.1.7–**Collaborate with BLM to ensure that sensitive resources on Nellis AFB and the NTTR are mapped and avoidance and minimization measures are clearly defined and readily available for Incident Command staff during firefighting activities.

- **Project 4.1.8–**Review all fuels reduction activities for pollinator impacts using the *Air Force Pollinator Conservation Strategy and Reference Guide* (USFWS, 2017).

OBJECTIVE 4.2—Obtain site-specific fire weather data to inform wildland fire response operations.

- **Project 4.2.1–**Coordinate with BLM to determine the feasibility of installing up to 2 remote automatic weather stations on the NTTR.

GOAL 5: Update the Natural Resources Management Database and GIS to comply with spatial data standards for facilities, infrastructure, and the environment and provide the foundation for management.

OBJECTIVE 5.1—Enhance data utility and quality to provide ready access and easily inform management decisions.

- **Project 5.1.1–**Create and compile environmental GIS layers and maps for biological and non-biological resources (such as species occurrences, vegetative communities, soils, water, climate variables, topography, landscape, and geology) occurring across the Base and incorporate these into the Air Force GeoBase Program.

- **Project 5.1.2–**Update and acquire high-resolution aerial imagery every 5 years or as needed to monitor and document biological and non-biological resource expansions, reductions, and changes over time. Imagery shall be shared upon request with partner agencies once the appropriate NTTR office has reviewed it.

- **Project 5.1.3–**Maintain a comprehensive record of all wildfire ignition sources and report them to the Air Force Wildland Fire Center.

- **Project 5.1.4–**Ensure data collected during surveys and monitoring are submitted for entry into federal- and state-supported databases, such as the Avian Knowledge Network and North American Bat Monitoring Program. Work with federal and state partners to ensure local and regional data are considered when making management decisions for bats and avian species.

- **Project 5.1.5–**Provide datasets upon request to state and federal agencies, universities, and other researchers as determined appropriate by the Nellis Natural Resources Program.

OBJECTIVE 5.2—Maintain quality control on data collection, data entry, and database management.

- **Project 5.2.1–**Maintain spatial databases in compliance with the Air Force GeoBase Program (under AFI 32-10112, *Installation Geospatial Information and Services (IGI&S)*) to ensure proper metadata recordkeeping and standardization of geographic coordinate systems and projections.

OBJECTIVE 5.3—Maintain standardized protocols for data collection and quality assurance/quality control of data entry across natural resources projects.

- **Project 5.3.1–**Coordinate and collaborate with federal and state agencies, as well as non-governmental organizations, periodically when appropriate and possible to ensure that standardized protocols for data collection and analysis are up to date with the best available science.

2.3 SELECTION STANDARDS FOR ALTERNATIVE SCREENING

Consistent with 32 CFR § 989.8, selection standards were developed to establish a means for determining the reasonableness of an alternative to the Proposed Action and whether an alternative should be carried forward for further analysis in the EA. Potential alternatives to the Proposed Action were evaluated based on universal selection standards, which were applied to all alternatives. In accordance with 32 CFR § 989.8(c), the following selection standards meet the purpose of and need for the Proposed Action and were used to identify reasonable alternatives for analysis in the EA. Alternatives must

- assist the Base Commander with the conservation and rehabilitation of natural resources consistent with the use of the Base to ensure the readiness of the Armed Forces;
- provide natural resources guidelines that are consistent with the military mission and ensure no net loss in the capability of Base lands to support the military mission; and
- provide for the optimum use of land and water areas and access for military purposes while maintaining ecological integrity.

Based on the screening criteria, the Air Force determined that only the Proposed Action (i.e., the full suite of proposed INRMP projects) would meet the purpose of and need for action.

2.4 ALTERNATIVES RETAINED FOR DETAILED ANALYSIS

2.4.1 Proposed Action

The Proposed Action as described in **Section 2.2** represents the Air Force's Preferred Alternative. As described above, the Proposed Action is the only reasonable alternative that would meet the Air Force's purpose of and need for action. Therefore, the Proposed Action is retained as an alternative for more detailed analysis in this EA.

2.4.2 No Action Alternative

Under the No Action Alternative, management of natural resources would continue as characterized in the 2019 INRMP. The proposed projects described above would not be implemented, and the Air Force would not receive updated information on the effects of military activities on natural resources. Over time, the ability of the Base to develop an appropriate natural resources management framework would diminish, along with the Base's ability to support the military mission while facilitating effective natural resources management and minimizing the impacts of military operations on natural resources.

While the No Action Alternative would not satisfy the purpose of and need for the Proposed Action, this alternative is retained to provide a comparative baseline against which to analyze the effects of the Proposed Action, as required under the CEQ regulations (40 CFR § 1502.14(d)). The No Action Alternative reflects the status quo and serves as a benchmark against which the effects of the Proposed Action can be evaluated.

2.5 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

The potential impacts under the Proposed Action and No Action Alternative are summarized in **Table 2-1**. The summary is based on information discussed in detail in **Chapter 3** of this EA and includes a concise definition of the issues addressed and the potential environmental impacts associated with each alternative.

Table 2-1.
Summary of Environmental Consequences

Resource Area	Proposed Action	No Action Alternative
Land Use	Development of the Environmental Appreciation Park for recreation and conservation is compatible with the open space designation and would not be in conflict with the overall planning goals and land utilization of the Base.	There would be no changes to existing land use.
Earth Resources	There would be short-term, minor impacts to soils and negligible impacts to topography.	Reclamation and soil conservation projects would not be implemented. Geographical Information System layers for geology and soils would not be updated.
Air Quality and Climate Change	There would be negligible impacts to air quality and greenhouse gases (GHGs).	There would be no impacts to regional air quality or GHG emissions.
Water Resources	The Air Force would conduct beneficial surveys and take protection actions to water resources. There would be negligible impacts to stormwater and no impacts to groundwater or floodplains.	Surveys regarding locating of water resources, wetlands, and groundwater would not occur. Restoration of natural seeps and springs, along with reducing the harmful impacts to seeps and springs from native horses and burros, would not occur.
Biological Resources	The Air Force would conduct beneficial surveys and take protection actions to biological resources. There would be no significant negative impacts to biological resources and no adverse effects on threatened or endangered species.	Surveys of sensitive, threatened, or endangered species would not be completed. Tortoise and wild horse exclusion fencing would not be completed.
Cultural Resources	There would be no significant adverse impacts to cultural resources. Two archaeological sites are located in the Environmental Appreciation Park; the project would avoid these sites.	Cultural resources would not change from current condition.
Infrastructure, including Transportation and Utilities	Hazardous fuel treatment under the Cedar Peak power line would be beneficial to infrastructure. Additionally, retrofitting powerline features dangerous to raptors and removing raptor nests perched on dangerous powerline features would be beneficial to infrastructure/utilities. There would be short-term, negligible impacts to traffic during construction and no significant impacts to transportation utility usage or services.	There would be no improvements to the hazardous conditions present to the raptor populations. Hazardous fuel accumulation under the Cedar Peak power line infrastructure would not be cleared, leaving the infrastructure susceptible to wildland fire.
Safety and Occupational Health	There would be beneficial updates to ground safety by reducing the threat of wildfires. There would be improvements to flight safety by providing important data for the Bird/wildlife Aircraft Strike Hazard (BASH) Plan to reduce bird strikes.	There would be no improvements to the Wildland Fire Management Plan or BASH Plan.

BASH = Bird/wildlife Aircraft Strike Hazard; GHG = greenhouse gas

CHAPTER 3 EXISTING CONDITIONS AND ENVIRONMENTAL CONSEQUENCES

3.1 FRAMEWORK FOR ANALYSIS

To provide a framework for the analyses in this EA, the Air Force defined a study area specific to each resource or sub-resource area. Referred to as a Region of Influence (ROI), these areas delineate a boundary where possible effects from the considered alternatives would have a reasonable likelihood to occur. Beyond these ROIs, potential adverse effects on resources would not be anticipated. For the purposes of analysis, potential effects are described as follows:

- **Beneficial–**positive effects that improve or enhance resource conditions
- **Adverse–**negative or harmful results
- **Negligible–**adverse effects likely to occur but at levels not readily observable by evaluation
- **Minor–**observable, measurable, tangible adverse effects qualified as below one or more significance threshold(s)
- **Moderate–**tangible effects that are readily apparent, qualified as below one or more significance threshold(s)
- **Significant–**obvious, observable, verifiable adverse effects qualified as above one or more significance threshold(s); not mitigable to below significance

When relevant to the analyses in this EA, potential effects are further defined as direct or indirect; short- or long-term; and temporary, intermittent, or permanent.

To determine the potential for "significant" effects under the Proposed Action, the Air Force defined impact thresholds to support the analyses in this EA. Based upon the nature of the Proposed Action and the affected environment, both qualitative and quantitative thresholds were used as benchmarks to qualify effects. Further, each resource analysis section (i.e., **Sections 3.4–3.11**) concludes with a cumulative effects analysis considering the Proposed Action in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at Nellis AFB. **Table 3-1** summarizes past, present, and reasonably foreseeable planned actions at Nellis AFB considered in the cumulative effects evaluation.

Table 3-1.
Past, Present, and Reasonably Foreseeable Environmental Trends and Planned Actions

Name	Description	Timeframe	Approximate Distance from Base
Air Combat Command (ACC) at Nellis Air Force Base (AFB) West Side Development Projects	The construction of new facilities, renovations and repair of existing facilities, implementation of infrastructure improvements, and demolition of obsolete facilities will address deficiencies in existing facilities and infrastructure at Nellis AFB	Active for next 6 years	On Nellis AFB
Northern Hub Development, Tolicha Peak Water Facility at the NTTR	Development project to construct a new well and water treatment facility at the Tolicha Peak Electronic Combat Range	Active NEPA (timeframe 2–5 years)	On NTTR Northern Range
Master Plan and Installation Development at Nellis AFB	Development of the east side of Nellis AFB	Active NEPA (timeframe 5–10 years)	On Nellis AFB

ACC = Air Combat Command; AFB = Air Force Base; NTTR = Nevada Test and Training Range; NEPA = National Environmental Policy Act

3.2 Resources Considered but Eliminated from Detailed Analysis

CEQ regulations state that federal agencies should "identify and eliminate from detailed study the issues which are not significant, or which have been covered by prior environmental review" (40 CFR § 1501.9(f)(1)). Accordingly, the Air Force considered but eliminated from further analysis the following environmental resources:

- **Hazardous Materials/Waste/Toxic Materials–**Hazardous materials were eliminated from detailed analysis because the only INRMP projects that have ground disturbance are minor fencing projects that would not be anticipated to impact hazardous materials sites.
- **Airspace Management and Use**–Airspace management and use were eliminated from detailed analysis because none of the proposed activities would directly impact airspace or flight operations.
- **Noise**–Noise was eliminated from detailed analysis because none of the proposed INRMP projects would result in noise impacts within populated areas.
- **Socioeconomics**–Socioeconomics was eliminated from detailed analysis because none of the INRMP projects would have direct or indirect impacts on housing, jobs, or similar socioeconomic issues.
- **Environmental Justice/Children**–Environmental justice was eliminated from detailed analysis because the INRMP projects would primarily occur within unpopulated areas and would have no effect on environmental justice communities of concern.

3.3 Resources Carried Forward for Detailed Analysis

The Air Force considered Nellis AFB, the NTTR, and its environs as the ROI for each environmental resource. None of the projects under the Proposed Action would occur outside the boundaries of Nellis AFB or the NTTR. The following resources were carried forward for analysis: land use; earth resources; air quality and climate change; water resources; biological resources; cultural resources; infrastructure, including transportation and utilities; and safety and occupational health.

3.4 Land Use

3.4.1 Definition of Resources

The term "land use" refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel. In many cases, land use descriptions are codified in local zoning laws; however, no nationally recognized convention or uniform terminology has been adopted for describing land use categories. As a result, the meanings of various land use descriptions, labels, and definitions vary among jurisdictions. The Installation Development Plan is Nellis AFB's planning tool to guide future development on the Base to be aligned with current and programmed mission requirements and was prepared in response to AFI 32-7062, *Comprehensive Planning*. Goals and objectives of land use planning are to maintain mission readiness; achieve and maintain compliance with operational, safety, environmental, energy, and security regulations and requirements; maximize functional capabilities through the utilization and adaption of existing areas; incorporate Leadership in Energy and Environmental Design guidelines; achieve environmental compliance through reduction of the installation environmental footprint; and foster awareness of the installation by community stakeholders (Nellis AFB, 2018a).

Projects that would occur within the NTTR under the Proposed Action would have no impacts to land use; therefore, land use on the NTTR is not further evaluated in this EA.

The ROI for land use is Nellis AFB and its environs.

3.4.2 Existing Conditions

Nellis AFB is located northeast of the city of Las Vegas in Clark County, Nevada. It occupies approximately 16,439 acres of land and is divided into three areas: Area I (the Main Base), Area II, and Area III.

Area I is located east of Las Vegas Boulevard and contains 31 percent of the total Base land area. Area I contains the greatest variety of land use activities, including runways, industrial facilities, housing areas, and most of the Base's administrative, training, and support facilities. Inside Area I, there are more than 1,439 buildings that include family housing units (enlisted and officers), dormitories, and billeting facilities. Industrial land use and open space account for about 39 and 36 percent of all Nellis AFB land, respectively. Most of the area designated as industrial is mandatory open space to provide safety zones around munitions storage or similar facilities.

Area II is located northeast of the Main Base and accounts for 62 percent of the total Base land area. The majority of Area II is undeveloped acreage. The 801st Red Horse, 820th Red Horse, 57 MUNS, and 58 RQS are the primary occupants of the developed acreage.

Area III, west of Las Vegas Boulevard, makes up 7 percent of the total Base land area. The majority of Base family housing units and recreational facilities is located in Area III. Area III also houses the Mike O'Callaghan Medical Center Campus, which occupies the hospital facilities vacated by the Veterans Administration. A large solar photovoltaic array covers much of the remaining undeveloped land in Area III.

To address land use with respect to noise, an Air Installations Compatible Use Zones (AICUZ) report was developed in 2017 for Nellis AFB. Aviation easements guide land use around the Base to applications that are compatible with an operational AFB and the AICUZ Program. The purpose of the 2017 AICUZ report is to promote development compatible with the defense flying mission while protecting the health, safety, and welfare of neighbors in surrounding municipalities while preserving the defense flying mission. The study presented planning noise contours with recommendations for compatible land use in the vicinity of the Base (Air Force Civil Engineer Center, 2017).

3.4.3 Environmental Consequences

3.4.3.1 Evaluation Criteria

Potential impacts on land use are based on the level of land use sensitivity in areas potentially affected by a Proposed Action as well as compatibility of the action with existing conditions. In general, a land use impact would be adverse if it meets one of the following criteria:

- Inconsistency or noncompliance with existing land use plans or policies,
- Precluded the viability of existing land use,
- Precluded continued use or occupation of an area,
- Incompatibility with adjacent land use to the extent that public health or safety is threatened, or
- Conflict with planning criteria established to ensure the safety and protection of human life and property.

3.4.3.2 Proposed Action

The implementation of projects and objectives under Goals 1, 3, 4, and 5 of the Proposed Action would have no potential to impact existing land use on Nellis AFB. Under Goal 2, the projects associated with Objectives 2.1–2.10 would also have no potential to impact existing land use.

Project 2.11.1 would construct an environmental appreciation park that would provide access to Base residents for walking, jogging, and biking opportunities. The proposed project would take place in Area III (**Figure 3-1**) and would include installation of an elevated boardwalk. The boardwalk would have railings, benches, and shaded picnic areas for residents to utilize the outdoor space. The location proposed for the environmental appreciation park is currently designated as open space land use. The development of the land for recreation and conservation would be compatible with the current open space designation and

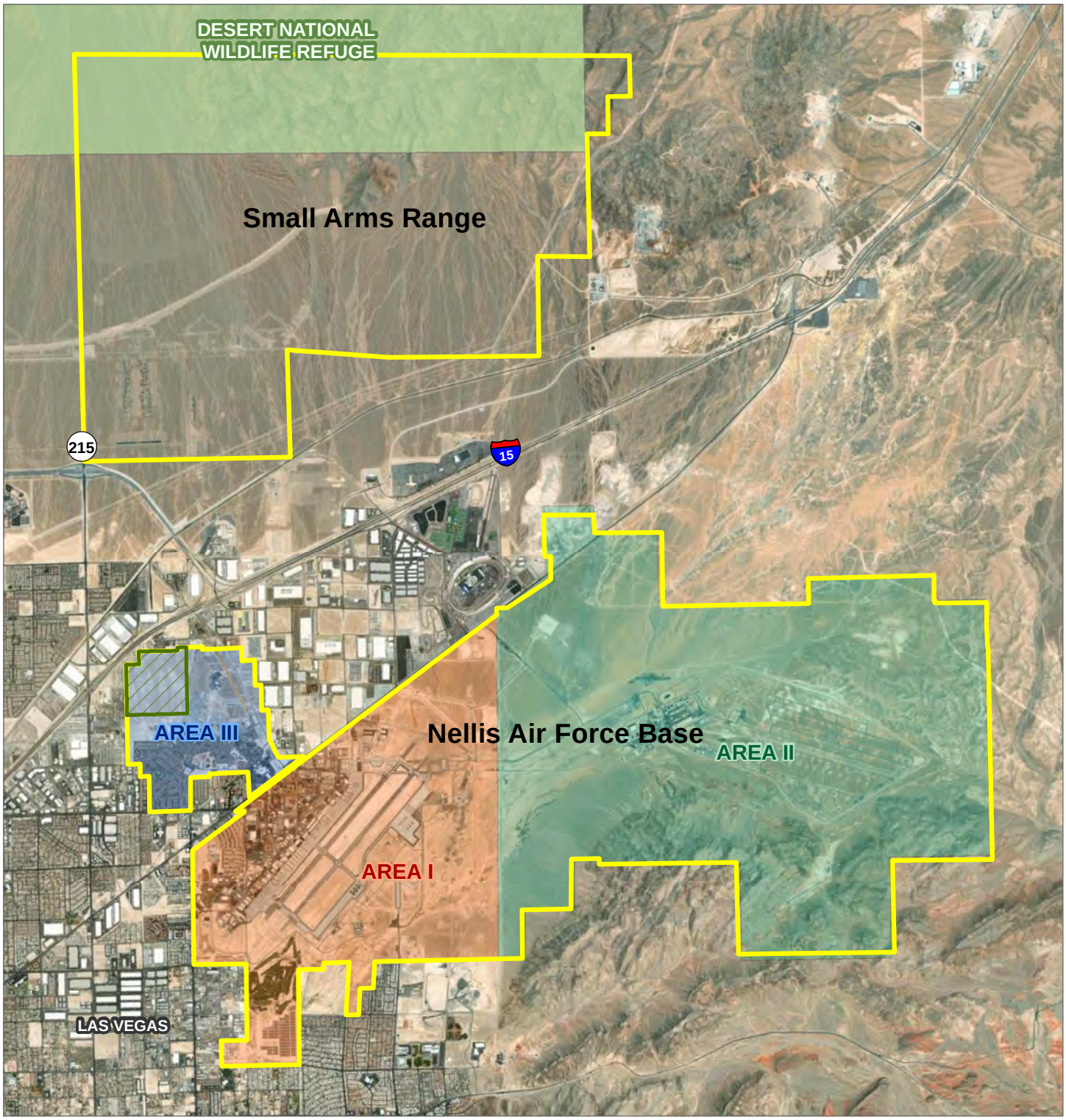


FIGURE 3-1
Land Use

Proposed Environmental Appreciation Park

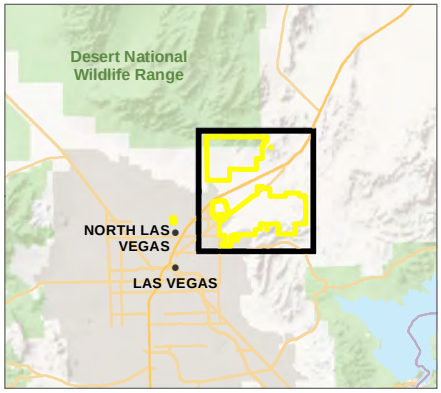
Installation Boundary

Desert National Wildlife Refuge

N

0 1 2 Miles

Imagery: ESRI, 2021.
Coordinate System: NAD 83 UTM Zone 11N



would not be in conflict with the overall planning goals and land utilization of the Base**.** Therefore, no significant impacts would occur to existing land use or land use compatibility under implementation of the Proposed Action.

3.4.3.3 Cumulative Impacts

The Proposed Action would not change land use, would be consistent with existing land use, and would not affect future adjacent land use. When considered in conjunction with other past, present, and reasonably foreseeable future actions at Nellis AFB and the NTTR, no significant cumulative effects to land use would be anticipated to occur under implementation of the Proposed Action.

3.4.3.4 No Action Alternative

Under the No Action Alternative, the Proposed Action as described above would not occur and management of natural resources would continue as characterized in the 2019 INRMP. The environmental appreciation park would not be constructed, which would limit opportunities for the public to access to the area for recreational purposes. Over time, the ability of the Nellis AFB and NTTR to develop an appropriate natural resource resources management framework would diminish, along with the Base's ability to support the military mission while facilitating effective natural resources management and minimizing the impacts of military operations on natural resources.

3.4.3.5 Best Management Practices and Mitigation Measures

No land use BMPs or mitigation measures would be required under implementation of the Proposed Action.

3.5 EARTH RESOURCES

3.5.1 Definition of the Resource

Earth resources include geology, topography, and soils. Geology refers to the structure and configuration of the earth's surface and subsurface features. Characteristics of geology include geomorphology, subsurface rock types, and structural elements. Topography refers to the shape, height, and position of the land surface. Soil refers to the unconsolidated materials overlying bedrock or other parent material. Soils are defined by their composition, slope, and physical characteristics. Attributes of soil, such as elasticity, load-bearing capacity, shrink-swell potential, and erodibility determine its suitability to support a particular land use.

Prime farmland, as defined by the US Department of Agriculture (USDA) in the *Farmland Protection Policy Act* (7 USC §§ 4201–4209), is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is available for these uses.

The ROI for earth resources is Nellis AFB and the NTTR.

3.5.2 Existing Conditions

3.5.2.1 Geology

Nellis AFB

Nellis AFB is located in Las Vegas Valley. The sedimentary formations at Nellis AFB consist of limestone mixed with sandstone, shale, dolomite, gypsum, and quartzite. Alluvial deposits, areas of material left behind by rivers, are found to the east and north of the Installation. These deposits are dissected by numerous drainage channels. In the upper reaches of the valley, these deposits consist of gravelly, cobbly, and stony sand material that transitions to finer textured material closer to the valley floors. The basin floors contain late-laid silt and clay and younger alluvial deposits. Most of these alluvial deposits have been transported by water and deposited on the sloping basin floors of the floodplains, which is a continuing process (Nellis AFB, 2019b).

Nellis AFB is located in Seismic Zone 2B, which is considered an area of moderate damage potential; however, most of the faults found in the area of the Installation are considered inactive (Nellis AFB, 2019b).

NTTR

The mountain ranges in the South Range of the NTTR are dominated by carbonate rocks mixed with smaller amounts of alluvium from erosion of nearby mountain ranges. Sedimentary rocks from lakes and rivers have been deposited in shallow basins and outcrops in several areas within the NTTR (Nellis AFB, 2019b).

Volcanic rocks dominate the geology of the North Range of the NTTR. The Timber Mountain caldera is one of several sources of volcanic activity in the North Range. Volcanic tuff (hardened clay) originating from the volcanic sources extends throughout the North Range including the extensive tableland of the western Pahute Mesa, the southern Cactus and Kawich Ranges, and Stonewall Mountain (Nellis AFB, 2019).

Most of the faults found on the NTTR are associated with regional mountain formation. The western one-third of the NTTR is located within Seismic Zone 3, while the eastern two-thirds are in Seismic Zone 2B. Seismic Zone 3 is considered an area with major damage potential. The Yucca fault, located in the south-central portion of the NTTR, is the only fault that is considered active. Several inactive or potentially active faults are also present at the NTTR; however, most faults on the NTTR are considered inactive (Nellis AFB, 2019).

3.5.2.2 Topography

Nellis AFB

Nellis AFB sits within the Basin and Range physiographic province, which consists of a series of north-south trending mountain ranges and basins that extend from southeast Oregon to Mexico (Nellis AFB, 2019).

Nellis AFB is in the northeastern part of the Las Vegas Valley at approximately 1,900 feet above mean sea level (AMSL). The toes of alluvial fans that extend south from the Las Vegas Range and northwest from Sunrise Mountain reach the edges of the Installation. A gently sloping valley floor underlain mostly by fine-grained alluvial silts lies between the two mountain ranges. The area occupied by the Small Arms Range (SAR) consists mainly of alluvial fans extending from the Las Vegas Range and the Apex Hills and is bisected by a large levee that diverts and channels floodwaters that occasionally flow off the Las Vegas Range. In addition to the Las Vegas Range and Sunrise Mountain, topographic features in the Nellis AFB area include Frenchman Mountain approximately 4 miles southeast of the Installation and Dry Lake Range approximately 32 miles northeast of the Installation (Nellis AFB, 2019).

NTTR

The topography over most of the NTTR is undisturbed; however, some areas have been locally modified by human-made features. The NTTR ranges in elevation from 1,900 to over 8,500 feet AMSL, and as a result has a variety of topographic features ranging from flat expanses of land to mountain ranges to the valley floors that lie between them. On the North Range, the valley floors vary from 3,900 to 5,200 feet AMSL; on the South Range, they vary from 2,900 to 3,600 feet AMSL (Nellis AFB, 2019).

The topography of the NTTR connects habitats, species, communities, and ecosystems without fragmentation, which frequently occurs in areas outside of the NTTR. The NTTR lacks major highways and agriculture and provides relatively uninterrupted north-south migration corridors in the Great Basin and Range Province. The topography of the area also allows the NTTR to provide protected, relatively undisturbed areas where species can live without being affected by various human activities (Nellis AFB, 2019).

3.5.2.3 Soils

Nellis AFB

The types of soil and soil associations that can be found on Nellis AFB are displayed in **Figure 3-2** and summarized in **Table 3-2**. Four of these types/associations make up over 60 percent of the total soil on the Installation: the Weiser-Wechech soil association (31.1%), the Upperline-St. Thomas-Upperline soil association (15.2%), the St. Thomas-Rock Outcrop soil association (8.5%), and Glencar silt loam (5.3%). The Weiser-Wechech association and glencarb silt loam soil are characterized by low slopes, while the Upperline-St. Thomas-Upperline association is characterized by low-to-moderate slopes and the St. Thomas-Rock Outcrop association is characterized by moderate-to-very steep slopes.

The Weiser soil portion of the Weiser-Wechech association is well drained with low runoff potential, while the Wechech portion is well drained with very high runoff potential. The Upperline portion of the Upperline-St. Thomas-Upperline association is well drained with medium runoff potential, while the St. Thomas portion is well drained with very high runoff potential, and the second Upperline soil (Upperline, dry) is well drained with low runoff potential. The St. Thomas-Rock Outcrop association is well drained with very high runoff potential. Each of these soils is characterized by slight susceptibility to wind and water erosion, and medium runoff potential. The medium-to-very high runoff potential of several of the soils found on Nellis AFB contributes to the potential for flash flooding as they are not able to effectively absorb precipitation, driving the need for stormwater infrastructure on the Installation despite low rainfall (Nellis AFB, 2019).

Table 3-2.
Soil Types at Nellis AFB[a]

Map Unit Symbol	Name	Slope (%)	Acres in ROI	Percent of ROI
100	St. Thomas-Rock outcrop association	15–75	2,429.9	8.5
160dn	Wechech-Weiser-Whitebasin association	2–15	656.2	2.3
167	Upperline-St. Thomas-Upperline association	2–30	4,353.1	15.2
178	St. Thomas-Iceberg-Rock outcrop association	15–50	1,996.7	7
200	Glencarb silt loam	0–2	1,505.9	5.3
230	Wechech-Weiser association	2–8	1,321.1	4.6
233	Wechech-Ifteen association	4–30	983	3.4
236	Glencarb very fine sandy loam, saline	0–2	789.3	2.8
302	Las Vegas-McCarran-Grapevine complex	0–4	414.6	1.4
305	Las Vegas-DeStazo complex	0–2	912.5	3.2
307	Las Vegas-Skyhaven complex	0–4	358.4	1.2
313	Weiser-Oldspan-Wechech association	2–8	465.1	1.6
314	Weiser-Wechech association	2–8	8,866.6	31.1
581	Threelakes-Weiser association	2–8	346.9	1.2
615	Urban land	N/A	1,209.3	4.2
721	Corncreek-Badland-Pahrump association	0–8	435.3	1.5

Source: USDA Soil Survey Geographic Database
Notes:
a Soil types that make up less than 1 percent of the ROI were not included in Table 3-2.
N/A = not applicable; ROI = Region of Influence

NTTR

The soils in the NTTR have not been formally surveyed by the US Geological Survey. However, these soils are largely derived from alluvial deposits of quartzite, sandstone, and shale eroded from the nearby mountain ranges (Nellis AFB, 2019; Cole, 1997).

3.5.2.4 Prime Farmland

As the land on Nellis AFB and within the NTTR has been and will continue to be used primarily for military activities and operations, the consideration of prime farmlands is not necessary. Additionally, the primary soils found in both areas are not classified as prime farmland; therefore, no adverse effects to prime farmland would be expected. Prime farmland is not discussed further in this EA.

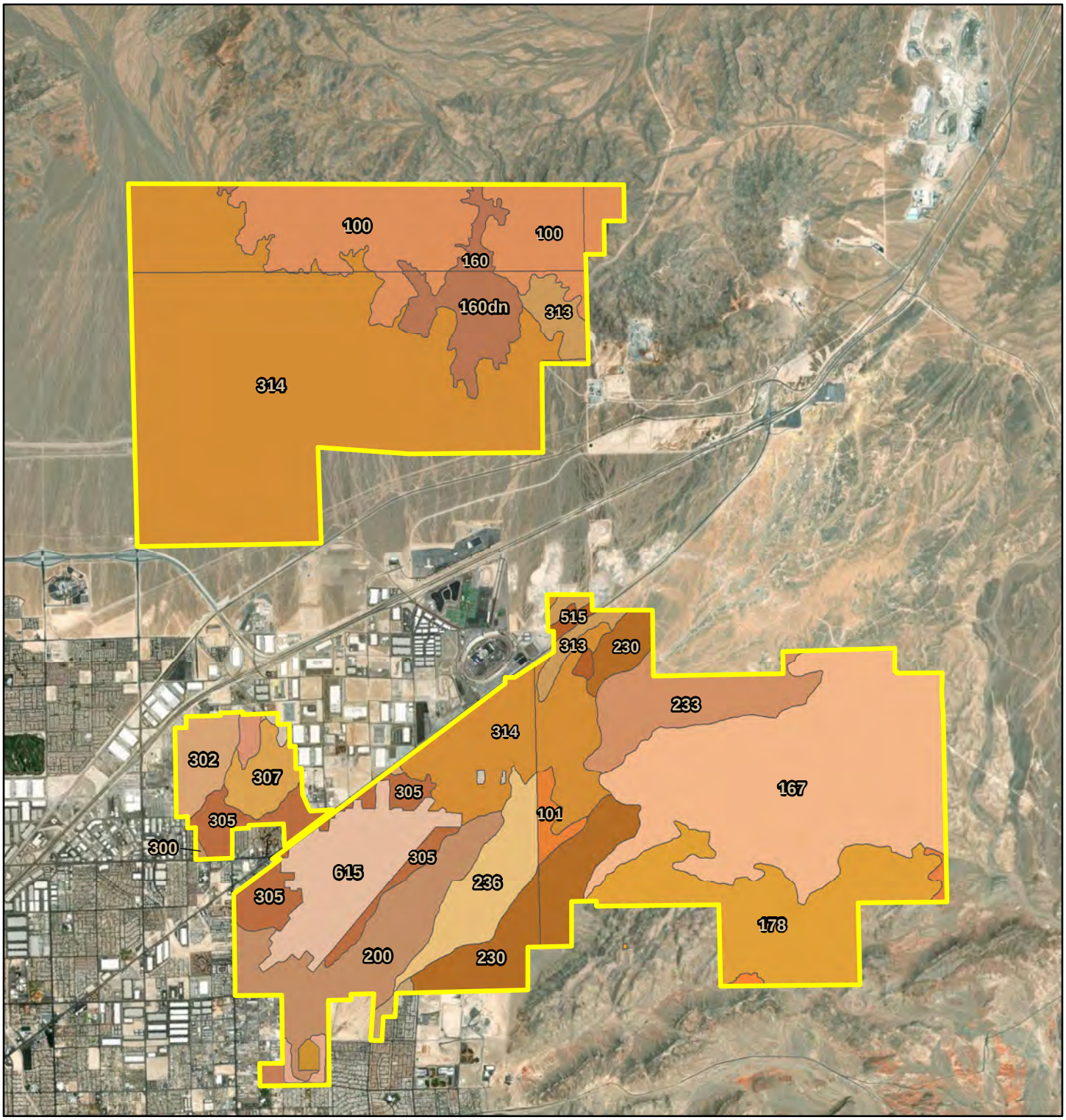


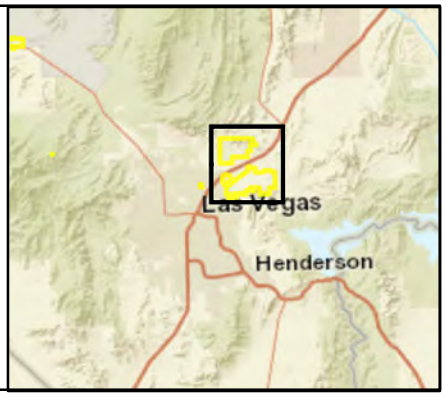
FIGURE 3-2
Soils

- Installation Boundary
- 100 St. Thomas-Rock Outcrop Association
- 160dn Wechech-Weiser-Whitebasin Association
- 167 Upperline-St. Thomas-Upperline Association
- 178 St. Thomas-Iceberg-Rock Outcrop Association
- 200 Glencarb Silt Loam
- 313 Weiser-Oldspan-Wechech Association
- 230 Wechech-Weiser Association
- 233 Wechech-Ifteen Association
- 236 Wechech-Weiser-Whitebasin Association
- 302 Las Vegas-McCarran-Grapevine Complex
- 305 Las Vegas-DeStazo Complex
- 307 Las Vegas-Skyhaven Complex
- 314 Weiser-Wechech Association
- 581 Threelakes-Weiser Association
- 615 Urban Land
- 721 Corncreek-Badland-Pahrump Association

N

0 0.75 1.5 Miles

Coordinate System: WGS 1984 UTM Zone 11N



3.5.3 Environmental Consequences

3.5.3.1 Evaluation Criteria

The Air Force defines a significant effect on earth resources within the ROI as one or more of the following:

- substantial alteration of unique or valued geologic or topographic conditions;
- substantial soil erosion, sedimentation, and/or loss of natural function (e.g., compaction); and
- development on soils with characteristics that do not support the intended land use.

3.5.3.2 Proposed Action

Geology
The implementation of projects and objectives under the Proposed Action would have no potential to impact the existing geology of Nellis AFB and the NTTR.

Topography
The implementation of projects and objectives under the Proposed Action would have no potential to impact the existing topography of Nellis AFB and the NTTR.

Soils
Under Goal 1, Project 1.9.13 would involve collection of soil samples from playa beds to determine the presence of fairy shrimp on the NTTR. This project would have a short-term, negligible impact on soils as the samples would not remove enough material to disturb the surrounding environment. All remaining projects under Goal 1 would have no potential to impact soils.

Under Goal 2, Project 2.1.3 would reduce foot traffic to protect the Las Vegas bearpoppy and would have long-term beneficial impacts on soil. Continuous foot traffic on soils forces out small pockets of air between soil particles, resulting in soil compaction and increasing the soil's density. This makes it harder for water to filter through the soil back into the ground, and for plants to root into the denser earth. A decrease in soil disturbance from foot traffic would reduce further soil compaction, promote vegetation growth, and allow for healthier soil, as vegetation would be able to grow and the healthier vegetation would in turn lead to healthier soil composition and structure (Rutgers University, 2023).

Project 2.2.4 would reseed certain portions of land to restore Mojave desert tortoise habitat and would have long-term beneficial impacts on soil, as native plants may help to combat soil erosion. Soil cover, or plants that cover the soil, contribute to healthy soil, and living roots also reduce soil erosion, and provide food for organisms and microbes that cycle necessary soil nutrients (USDA, 2023). Native plants are also likely to conserve plant-microbe-soil interactions, which help aerate soil and maintain its structure (Shelef et al., 2017; Dorner, 2002).

Projects 2.2.7, installation of exclusionary fencing at new developments and expansion of fencing at the rock quarry, and Project 2.4.2, installation, maintenance, and monitoring of exclusionary fencing around springs and seeps used by wild horses and burros, would have short-term, negligible, adverse impacts on soil due to disturbances from the installation of fence posts. Project 2.4.2 would also have long-term beneficial impacts on soils as the fences would prevent wild horses and burros from trampling the soils around these sensitive water sources and prevent continued soil compaction, allowing for healthier soil.

Desert tortoise habitat restoration under Project 2.6.3 would have long-term beneficial impacts on soils. Converting roads and two-tracks back into natural areas for habitat and discontinuing their use for travel would prevent further soil compaction from vehicles and create conditions for healthier soil. Removing invasive plants would also benefit soil health, as invasive plants have been shown to reduce soil nutrients and negatively impact soil structure, ecosystem function, and microbiome (Teixeira et al., 2020; University of Nevada, 2023).

Project 2.8.3 would install soil monitors to conduct ongoing soil moisture monitoring and would have minor, long-term, beneficial impacts on soils by providing additional data about soil properties and conditions which would inform better, more effective soil management practices.

Projects 2.9.3 through 2.9.6, which include monitoring and control measures for invasive plant species, would have long-term beneficial impacts on soil. Invasive plants reduce soil nutrients which negatively impacts soil health as healthy soil needs certain levels of essential nutrients (Teixeira et al., 2020). Invasive plants that have shallow root systems, such as cheatgrass, push out native species that tend to have much deeper root systems, which affects the diversity and abundance of soil microorganisms. Shallow root systems are also less effective at cycling nutrients through the soil (Working Lands for Wildlife, 2018). Invasive grasses also reduce structural stability of the soil (Drake et al., 2016).

Project 2.10.2 would document damage to soils from wild horses and burros and would have long-term beneficial impacts on soils by providing additional data about the types of soil damage occurring on Nellis AFB and the NTTR. Implementation of Project 2.10.2 would inform better soil protection methods and management techniques.

The addition of an elevated boardwalk under Project 2.11.1 would have long-term beneficial impacts on soils by preventing further soil compaction from continued foot traffic. Soil compaction negatively impacts the ability of plants to grow and of water to infiltrate through the soil back into the ground. The construction activities associated with this project would have short-term, minor impacts from soil disturbance from installation of posts and/or supports to hold up the boardwalk and construction of shaded picnic areas, and from soil disturbance in the project area from construction activities and any necessary equipment staging. All remaining projects under Goal 2 would have no potential to impact soils.

Project 3.2.8, collection of representative seed samples of plant species found on the NTTR, would have long-term beneficial impacts on soils, as future land stabilization and rehabilitation/restoration of degraded land area would have positive effects on soil health and structure. All remaining projects under Goal 3 would have no potential to impact soils.

Reducing the threat of wildfire under Projects 4.1.1 through 4.1.4 would have long-term beneficial impacts on soils. Projects 4.1.5 and 4.1.6 would treat invasive species and have long-term beneficial impacts on soils due to the negative impact of invasive species on soil health. Invasive plant populations, including Bromus species, are commonly associated with increased risk of wildfires and represent a wildfire threat on the NTTR. Removal of invasive species that can degrade soil health and compromise soil structure from a lack of deep rooting vegetation would result in a long-term beneficial impact to soils. Under Project 4.2.1, installation of remote automatic weather stations on the NTTR would have short-term negligible impacts to soils due to construction activities and soil disturbance. All remaining projects under Goal 4 would have no potential to impact soils.

Project 5.1.1 would compile GIS data and create layers with data on various biological resources, including soils, allowing for better analysis and characterization of the soil environment on Nellis AFB and the NTTR. Implementation of Project 5.1.1 would result in long-term beneficial impacts on soils due to the implementation of management techniques that are best suited to the specific soil environment found on the Installation and Range. All remaining projects under Goal 5 would have no potential to impact soils.

3.5.3.3 Cumulative Impacts

The Proposed Action would have beneficial cumulative impacts to soils as a result of reducing foot traffic, reseeding, managing invasive species, converting certain land areas to back to natural habitat, and collecting information that would inform appropriate soil management techniques. Other past, present, and reasonably foreseeable projects occurring within Nellis AFB and the NTTR would contribute to increased soil disturbance, particularly development of the east side of Nellis AFB. BMPs and compliance with required permits would minimize the cumulative effect on soils. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at Nellis AFB and the NTTR, no significant cumulative effects to earth resources would be anticipated to occur with implementation of the Proposed Action.

3.5.3.4 No Action Alternative

Under the No Action Alternative, the Proposed Action as described above would not occur and management of natural resources would continue as characterized in the 2019 INRMP. The Air Force would not receive updated information on the effects of military activities on natural resources. Soil health would

continue to degrade in areas where there are invasive plant populations, and where animal trampling and foot and/or vehicle traffic is frequent. Over time, the ability of Nellis AFB and the NTTR to develop an appropriate natural resources management framework would diminish, along with the Base's ability to support the military mission while facilitating effective natural resources management and minimizing the impacts of military operations on natural resources.

3.5.3.5 Best Management Practices and Mitigation Measures

If project actions result in soil disturbance that exceeds 5 acres, in the Northern Range (Nye and Lincoln Counties), Nellis AFB would need to obtain an NDEP Surface Area Disturbance permit, which is required for all disturbances of surface areas greater than 5 acres that are not related to agriculture.

If project actions result in soil disturbance or construction activity that exceeds 0.25 acre or greater or trenching 100 ft or greater, in the Southern Range (Clark County), Nellis AFB would need obtain a Clark County Dust Control Operating Permit.

If any project exceeds 1 acre, Nellis AFB would be required to obtain a NDEP Storm Water Pollution Prevention Plan from the State.

All requirements and soil management techniques outlined in these permits would be followed to minimize impacts to soils to the greatest extent possible.

3.6 AIR QUALITY AND CLIMATE CHANGE

3.6.1 Definition of the Resource

Air pollution is a threat to human health and damages trees, crops, other plants, waterbodies, and animals. It creates haze or smog that reduces visibility in national parks and cities and interferes with aviation. To improve air quality and reduce air pollution, Congress passed the Clean Air Act (CAA) and its amendments in 1970 and 1990, which set regulatory limits on air pollutants and help to ensure basic health and environmental protection from air pollution.

The USEPA has divided the country into geographical regions known as air quality control regions to evaluate compliance with the National Ambient Air Quality Standards (NAAQS). Nellis AFB is located in Clark County, Nevada, which is in the Las Vegas Intrastate Air Quality Control Region (LVIAQCR) (40 CFR § 81.80) and serves as the ROI for INRMP projects within Nellis AFB. The LVIAQCR encompasses most of the Las Vegas Area and portions of the NTTR Southern Range. The NTTR is located within Clark, Nye, and Lincoln counties within the Nevada Interstate Air Quality Control Region (NIAQCR) (40 CFR § 81.276), which serves as the ROI for proposed INRMP projects within the NTTR. The NIAQCR encompasses most of the NTTR region including projects within the Northern Range.

3.6.1.1 Criteria Pollutants

In accordance with CAA requirements, the air quality in each region is measured by the concentration of various pollutants in the atmosphere. Measurements of these "criteria pollutants" in ambient air are expressed in units of parts per million (ppm) or in units of micrograms per cubic meter ($\mu g/m^3$).

The CAA directed the USEPA to develop, implement, and enforce environmental regulations that would ensure clean and healthy ambient air quality. To protect public health and welfare, the USEPA developed numerical concentration-based standards (i.e., NAAQS) for pollutants that have been determined to impact human health and the environment and established both primary and secondary NAAQS under the provisions of the CAA (**Table 3-3**). The primary NAAQS represent maximum levels of background air pollution that are considered safe, with an adequate margin of safety to protect public health. Secondary NAAQS represent the maximum pollutant concentration allowable for the protection of vegetation, crops, and other public resources in addition to maintaining visibility standards.

Ozone is not usually emitted directly into the air but is formed in the atmosphere by photochemical reactions involving sunlight and previously emitted pollutants, or "ozone precursors." These ozone precursors consist primarily of nitrogen oxides and volatile organic compounds that are directly emitted from a wide range of

emission sources. For this reason, regulatory agencies limit atmospheric ozone concentrations by controlling volatile organic compound pollutants (also identified as reactive organic gases) and nitrogen oxides.

Table 3-3.
National Ambient Air Quality Standards

Pollutant		Primary/ Secondary[a,b]	Averaging Time	Level[c]	Form
Carbon monoxide		Primary	8 hours	9 ppm	Not to be exceeded more than once per year
			1 hour	35 ppm	
Lead		Primary and Secondary	Rolling 3-month average	0.15 µg/m^3	Not to be exceeded
Nitrogen dioxide		Primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		Primary and Secondary	1 year	53 ppb	Annual mean
Ozone		Primary and Secondary	8 hours	0.070 ppm	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution	$PM_{2.5}$	Primary	1 year	12.0 µg/m^3	Annual mean, averaged over 3 years
		Secondary	1 year	15.0 µg/m^3	Annual mean, averaged over 3 years
		Primary and Secondary	24 hours	35 µg/m^3	98th percentile, averaged over 3 years
	PM_{10}	Primary and Secondary	24 hours	150 µg/m^3	Not to be exceeded more than once per year onaverage over 3 years
Sulfur dioxide		Primary	1 hour	75 ppb	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		Secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year

Source: NAAQS table

µg/m^3 = micrograms per cubic meter; NAAQS = National Ambient Air Quality Standards; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; ppb = parts per billion; ppm = parts per million; USEPA = US Environmental Protection Agency

Notes:

a. Primary Standards: the levels of air quality necessary, with an adequate margin of safety to protect public health. Each state must attain the primary standards no later than three years after that state's implementation plan is approved by the USEPA.

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

c. Concentrations are expressed first in units in which they were promulgated.

(1) In areas designated nonattainment for the lead standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m^3 as a calendar quarter average) also remain in effect.

(2) The level of the annual nitrogen dioxide standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.

(3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) ozone standards are not revoked and remain in effect for designated areas. Additionally, some areas may have certain continuing implementation obligations under the prior revoked 1-hour (1979) and 8-hour (1997) ozone standards.

(4) The previous sulfur dioxide standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which an implementation plan providing for attainment of the current (2010) standard has not been submitted and approved and which is designated nonattainment under the previous sulfur dioxide standards or is not meeting the requirements of a state implementation plan call under the previous sulfur dioxide standards (40 CFR § 50.4(3)). A state implementation plan call is a USEPA action requiring a state to resubmit all or part of its state implementation plan to demonstrate attainment of the required NAAQS.

3.6.1.2 General Conformity and Attainment

When a region or area meets NAAQS for a criteria pollutant, that region or area is classified as in "attainment" for that pollutant. When a region or area fails to meet NAAQS for a criteria pollutant, that region or area is classified as "nonattainment" for that pollutant. In cases of nonattainment, the affected state, territory, or local agency must develop a state implementation plan for USEPA review and approval. The state implementation plan is an enforceable plan developed at the state level that lays out a pathway for how the state will comply with air quality standards. If air quality improves in a region that is classified as nonattainment, and the improvement results in the region meeting the criteria for classification as attainment, then that region is reclassified as a "maintenance" area.

Under the CAA, the General Conformity Rule requires proposed federal agency activities in designated nonattainment or maintenance areas (i.e., attainment areas reclassified from a prior nonattainment designation) to demonstrate conformity with the state implementation plan for attainment of NAAQS. Agencies are required to show that the net change in emissions from a federal proposed action would be below applicable *de minimis* threshold levels (i.e., so minor as to merit disregard).

3.6.1.3 New Source Review

Per the CAA, the USEPA's Prevention of Significant Deterioration (PSD) New Source Review permit program regulates criteria and certain non-criteria air pollutants for air quality control regions designated as unclassified or in attainment status with respect to the federal standards. In such areas, a PSD review is required for new "major source" or "major modification of existing source" emissions that exceed 100 or 250 tons per year (tpy) of a regulated CAA pollutant, dependent on the type of major stationary source. For "minor source" emissions, a PSD review is required if a project increases a "major source" threshold.

3.6.1.4 Greenhouse Gases

Greenhouse gases (GHGs) are gases that trap heat in the atmosphere. These emissions are generated by both natural processes and human activities. The accumulation of GHGs in the atmosphere helps regulate the earth's temperature and contributes to global climate change. GHGs include water vapor, carbon dioxide, methane, nitrous oxide, ozone, and several hydrocarbons and chlorofluorocarbons. Each GHG has an estimated global warming potential, which is a function of its atmospheric lifetime and its ability to absorb and radiate infrared energy emitted from the earth's surface. The global warming potential of a particular gas provides a relative basis for calculating its carbon dioxide-equivalent (CO_2e) or the amount of CO_2e to the emissions of that gas. Carbon dioxide has a global warming potential of 1 and is therefore the standard by which all other GHGs are measured. The GHGs are multiplied by their global warming potential, and the resulting values are added together to estimate the total CO_2e.

The USEPA regulates GHG primarily through a permitting program known as the GHG Tailoring Rule. This rule applies to GHG emissions from larger stationary sources. Additionally, the USEPA promulgated a rule for large GHG emission stationary sources, fuel and industrial gas suppliers, and carbon dioxide injection sites if they emit 25,000 metric tons or more of CO_2e per year (40 CFR § 98.2(a)(2)).

3.6.1.5 Operating Permits

The State of Nevada has adopted the federal NAAQS. A "source" is defined pursuant to Nevada Revised Statue (NRS) 445B.155.

Nellis AFB/NTTR Southern Range

By authority of NRS 445B.500, the Clark County Board of County Commissioners established the Department of Air Quality Management in 2001. The Department of Air Quality Management, which is now known as the Department of Environment and Sustainability (DES), administers the air pollution control program for Clark County under provisions of the Clark County Air Quality Regulations. Permitting requirements for federal owners and operators are largely based on a "potential to emit," defined as the maximum capacity of a stationary source to emit any air pollutant under its physical and operational design

or configuration. Calculations are used to determine whether a federal facility is defined as a "major source" under the CAA requiring a Title V Operating Permit; however, some "non-major" or "minor source" federal owners or operators are subject to other stationary permitting requirements. Stationary source air permits, including Title V permits, are issued through the Permitting Section.

The mission of DES is to develop and implement high-quality, effective local programs to fulfill air quality regulatory requirements and address community concerns, thereby protecting the region's quality of life while facilitating orderly growth.

NTTR Northern Range

NDEP administers a permit program for stationary source emissions generated at federal facilities. Permitting requirements for federal owners and operators are largely based on a "potential to emit," defined as the maximum capacity of a stationary source to emit any air pollutant under its physical and operational design or configuration. Calculations are used to determine whether a federal facility is defined as a "major source" under the CAA requiring a Title V Operating Permit; however, some "non-major" or "minor source" federal owners or operators are subject to permit-by-rule requirements. Permits-by-rule authorize stationary source emissions for individual or specific operations.

3.6.2 Existing Conditions

The LVIAQCR, in which the ROI for projects within Nellis AFB are located, maintains the following designations for the NAAQS:

- moderate nonattainment for the 2015 O_3 NAAQS standard, as of January 5, 2023;
- maintenance/attainment for carbon monoxide and PM_{10}; and
- unclassifiable/attainment for lead, nitrogen dioxide, sulfur dioxide, and $PM_{2.5}$.

The NIAQCR, in which the ROI for projects within the NTTR is located, is designated as in attainment for all criteria air pollutants (40 CFR § 81.329).

As a federal installation that is considered a "major source" contributor for air pollution, Nellis AFB and the NTTR maintain a Title V Operating Permit, which requires monitoring emissions and reporting the findings. Title V is a federal program designed to standardize air quality permits and the permitting process for major sources of emissions across the country and requires the USEPA to establish a national operating permit program. USEPA defines a major source as a facility that emits or has the potential to emit any criteria pollutant or hazardous air pollutant at levels equal to or greater than the major source thresholds. The major source threshold for criteria pollutants may vary depending on the attainment status (e.g., marginal, serious, extreme) of the geographic area and the criteria or hazardous air pollutant in which the facility is located.

3.6.2.1 Air Emission Sources at Nellis AFB and the NTTR

Mobile source emissions are generated by aircraft, vehicles, equipment, and other sources that move or have the potential to move from place to place. Vehicle emissions include both government-owned vehicles and privately owned vehicles. Equipment emissions come from forklifts, backhoes, tractors, and other onsite construction equipment. Aerospace ground equipment used to service aircraft include generators, light carts, compressors, bomb lifts, hydraulic test stands, and other portable equipment required for aircraft operations. The most recent mobile and stationary source emissions inventories for Nellis AFB are presented in **Table 3-4**.

Table 3-4.
Nellis Air Force Base Mobile and Stationary Source Emission Summary

Source Category	VOC	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$
Stationary Source	18.94	13.68	25.26	0.57	22.51	4.7
Aerospace Ground Equipment	5.31	79.79	36.52	2.46	2.18	2.10
Aircraft Operations	25.63	115.37	103.40	9.03	18.77	16.34
Non-road Engines	21.68	331.19	22.44	0.22	3.03	2.88
On-road Vehicles	4.98	46.09	23.01	0.06	0.80	0.73
Totals	**76.54**	**586.12**	**210.63**	**12.34**	**47.29**	**26.75**

Source: Nellis AFB, 2018b, 2020a; USEPA 2020
Notes:
CO = carbon monoxide; NOx = nitrogen oxides; PM_{10} = particulate matter less than or equal to 10 microns in diameter; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound

3.6.2.2 Regional Climate

Nevada lies on the eastern side of the Sierra Nevada mountain range, which blocks moisture from the Pacific Ocean. Locally, average annual precipitation varies from 4 inches to more than 50 inches on high mountain peaks of the Sierra Nevada Mountains. The southern Nevada areas where Nellis AFB and the NTTR reside vary from 0 to 15 inches of precipitation annually.

Nellis AFB
The regional climate of the Las Vegas area is semiarid desert with mild winters, hot summers, and low precipitation. The climate at Nellis AFB is characterized by warm-to-hot spring, summer, and early fall temperatures (National Oceanic and Atmospheric Administration [NOAA], 2023). July is the hottest month, with an average daily high temperature of 105.7 degrees Fahrenheit (°F) and an average low temperature of 79.3°F. Average temperatures in spring, summer, and fall are 67.5°F (April), 92.5°F (July), and 70.6°F (October), respectively. Winter temperatures tend to be mild; December is the coolest month of the year, with an average daily high temperature of 59.3°F and an average low temperature of 37.1°F (NOAA, 2023).

Precipitation in Las Vegas occurs almost entirely in the form of rain. Las Vegas normally receives about 4.27 inches of precipitation annually, and extended periods of drought have been recorded (NOAA, 2023). Precipitation follows a bimodal pattern with seasonal peaks in winter and summer. Winter rains occur primarily in December, January, and February with an annual average of 0.49, 0.55 and 0.84 inches, respectively. Winter rains originate from frontal systems that begin in the Pacific Ocean and move eastward across Nevada. Summer rains result from moisture moving into Nevada from Mexico, the Gulf of Mexico, and/or the Gulf of California. Summer rains or monsoons tend to be highly localized and result in brief, torrential downpours often accompanied by high winds and lightning, causing flooding and flows in otherwise dry stream channels.

NTTR
Similar to Nellis AFB, NTTR is located in a semiarid-to-arid region. Average annual precipitation at NTTR ranges from 4 inches on the desert floor to about 16 inches in mountain areas. The Great Basin is a collection of terminal lake basins that lie between north-to-south trending mountain ranges. Most of the precipitation that falls, the bulk of which is snow, remains in the region until it is absorbed into the ground or evaporated, but is not drained from the region. Though the region is warm in the summer and has low relative humidity throughout the year, low temperatures and typically strong winds during the winter make this one of the coldest desert regions in the US. The entire NTTR lies within the hydrographic Great Basin, with the exception of the southern tip of Range 63.

During the cold season (late autumn through early spring), southward migration of the subtropical high-pressure zone brings mid-latitude depressions to the southwestern US. Winter precipitation results from either frontal-cyclonic (Pacific-type storms) or non-frontal-cyclonic circulation (Great Basin lows). In both instances, the Sierra Nevada to the west is a major barrier to moist air moving inland from the Pacific Ocean. Summer precipitation is rarely the product of large-scale frontal activity; instead, it occurs as localized thunderstorms that are caused by intense vertical air currents over heated terrain. At the NTTR, about 25 percent of the annual precipitation falls during the summer (June–early September), In the late summer (mid-July through mid-September), most of the precipitable water aloft in the Mojave desert

appears to originate from low-level northern flow, rather than from upper-level southeasterlies originating over the Gulf of Mexico. Tropical storms occurring August–October produce a different kind of warm-season precipitation event (Spaulding, 1985).

3.6.3 Environmental Consequences

3.6.3.1 Evaluation Criteria

The environmental impact methodology for air quality impacts presented in this EA is derived from Air Force Manual (AFMAN) 32-7002, *Environmental Compliance and Pollution Prevention* (February 2020). The Proposed Action is broken down into basic units. For example, a basic development project that consists of replacing a building with a new building could be broken down into demolition (square feet [ft^2]), grading (ft^2), building construction (ft^2 and height), architectural coatings (ft^2), and paving (ft^2). These data are then input into the Air Force's Air Conformity Applicability Model (ACAM), which models emissions based on the inputs and estimates air emissions for each specific criteria and precursor pollutant, as defined in the NAAQS. The calculated emissions are then compared against the applicable threshold based on the attainment status of the ROI. If the annual net increase in emissions from the project are below the applicable thresholds, then the Proposed Action and Alternatives are not considered significant and would not be subject to any further conformity determination. Assumptions of the model, methods, and detailed summary results are provided in **Appendix B** of this EA.

The LVIAQCR is in moderate nonattainment for the 2015 ozone NAAQS standard (40 CFR § 81.329) (USEPA, 2023). Due to the nonattainment, the 250 tpy PSD value is not used for ozone precursors; instead, a more restrictive 100 tpy value is used. Additionally, due to the toxicity of lead, the use of the lead PSD threshold as an indicator of potential air quality impact insignificance is not protective of human health or the environment. Therefore, the *de minimis* value is used instead. A PSD value is not used for CO_2e; however, it is still listed within the ACAM model to show that it is below the GHG Tailoring Rule of 25,000 metric tons per year. The following thresholds are applicable for the Proposed Action within the LVIAQCR:

- 100 tpy PSD value for ozone precursors (volatile organic compounds and nitrogen oxides)
- 100 tpy PSD value for maintenance of carbon monoxide and PM10
- 25 tpy de minimis value for lead

The NIAQCR, is designated as in attainment for all criteria air pollutants (40 CFR § 81.329). The following thresholds are applicable for the Proposed Action within the NIAQCR:

- 25 tpy de minimis value for lead

Assumptions
ACAM modeling for the Proposed Action within the LVIAQCR assumes an estimated area of grading of up to 200,000 ft^2 for the boardwalk and environmental appreciation park identified in Project 2.11.1. For construction and grading actions associated with the boardwalk, the estimated areas are assumed to be greater than the existing structures to allow for construction area accessibility, utilities improvements, and laydown storage. The ACAM modeling also assumes that up to 6,000 linear feet of tortoise exclusionary fencing will be installed under Project 2.2.7.

ACAM modeling for the Proposed Action within the NIAQCR includes the installation of exclusionary fencing for wild horses and burros around three springs for Project 2.4.2. It is assumed that fencing would be installed at approximately a 100-foot radius around the springs for a total length of up to 2,000 linear feet.

Schedule
For the purpose of the ACAM model, the grading, and trenching activities have been spread out over the 5 years of the INRMP implementation.

3.6.3.2 Proposed Action

Nellis AFB

Table 3-5 summarizes the results of the ACAM analysis annualized over the course of implementation of the Proposed Action within the LVIAQCR. **Table 3-6** summarizes the highest annual ACAM emissions for each pollutant compared to their respective thresholds for the Proposed Action within the LVIAQCR.

Table 3-5.
Annual Air Emissions, LVIAQCR

Pollutant	2025	2026	2027	2028	2029
Volatile organic compound	0.115	0.109	0.104	0.102	0.099
Nitrogen oxides	1.003	0.932	0.886	0.861	0.820
Carbon monoxide	1.207	1.176	1.163	1.164	1.161
Sulfur oxides	0.002	0.002	0.002	0.002	0.002
PM_{10}	2.504	2.500	2.496	2.494	2.492
$PM_{2.5}$	0.041	0.037	0.034	0.032	0.030
Lead	0.000	0.000	0.000	0.000	0.000
Ammonia	0.001	0.001	0.001	0.001	0.001
Carbon dioxide-equivalent	0.115	0.109	0.104	0.102	0.099

$PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter

Table 3-6.
Highest Annual Air Emissions and PSD Thresholds, LVIAQCR

Pollutant	Highest Annual Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (yes or no)
Volatile organic compound	0.115	100	No
Nitrogen oxides	1.003	100	No
Carbon monoxide	1.207	100	No
Sulfur oxides	0.002	250	No
PM_{10}	2.528	100	No
$PM_{2.5}$	0.041	250	No
Lead	0.000	25	No
Ammonia	0.001	250	No
Carbon dioxide-equivalent	0.115	N/A	N/A

N/A = not applicable; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter

Because of the limited nature of grading and trenching activities associated with the proposed projects within the LVIAQCR, implementation of the Proposed Action would result in very minimal air emissions—well below applicable thresholds.

NTTR

Table 3-7 summarizes the results of the ACAM analysis annualized over the course of implementation of the Proposed Action within the NIAQCR. **Table 3-8** summarizes the highest annual ACAM emissions for each pollutant compared to their respective thresholds for the Proposed Action within the NIAQCR.

Table 3-7.
Annual Air Emissions, NIAQCR

Pollutant	2025	2026	2027	2028	2029
Volatile organic compound	0.030	0.028	0.027	0.026	0.026
Nitrogen oxides	0.233	0.225	0.220	0.216	0.213
Carbon monoxide	0.367	0.363	0.361	0.361	0.361
Sulfur oxides	0.000	0.000	0.000	0.000	0.000
PM_{10}	0.032	0.031	0.030	0.029	0.029
$PM_{2.5}$	0.007	0.006	0.006	0.005	0.005
Lead	0.000	0.000	0.000	0.000	0.000
Ammonia	0.000	0.000	0.000	0.000	0.000
Carbon dioxide-equivalent	0.030	0.028	0.027	0.026	0.026

$PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter

Table 3-8.
Highest Air Emissions and Annual PSD Thresholds, NIAQCR

Pollutant	Highest Annual Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (yes or no)
Volatile organic compound	0.030	250	No
Nitrogen oxides	0.233	250	No
Carbon monoxide	0.367	250	No
Sulfur oxides	0.000	250	No
PM_{10}	0.032	250	No
$PM_{2.5}$	0.007	250	No
Lead	0.000	25	No
Ammonia	0.000	250	No
Carbon dioxide-equivalent	0.030	N/A	N/A

N/A = not applicable; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter

Because of the limited nature of grading and trenching activities associated with the proposed projects within the NIAQCR, implementation of the Proposed Action would result in very minimal air emissions—well below applicable thresholds.

3.6.3.3 Cumulative Effects

Within the NIAQCR, concurrent projects would include the NTTR Northern Hub development project. NEPA analysis for this project is ongoing; however, it is anticipated that annual air emissions for that project would be below the PSD threshold. The aggregation of these projects completed concurrently would also be below the PSD threshold in the NIAQCR.

Concurrent projects within the LVIAQCR on Nellis AFB would include development of the east side of Nellis AFB and Installation development projects on the west side of the Base. NEPA analyses for these actions are ongoing; however, it is expected that emissions associated with development on the west side would be below the PSD threshold (EAS, 2023a). Implementation of the INRMP projects concurrently with west side development would continue to be below the PSD thresholds. The Installation development of the east side of Nellis AFB proposes a significant amount of grading, construction, paving, increased building heating, and trenching. NEPA analysis is ongoing; however, it is expected that the proposed development would improve up to 2,000 acres of land and increase impervious surfaces by 1,480 acres on Nellis AFB (EAS, 2023b). This large area of impact would potentially result in air emissions exceeding the PSD thresholds for ozone precursors (volatile organic compounds and nitrogen oxides), carbon monoxide, PM_{10}, and possibly other pollutants. The concurrent INRMP projects would be anticipated to account for approximately 5 acres of grading and would be anticipated to contribute less than 1 percent of the cumulative air emissions impacts associated with proposed development.

When considered in conjunction with other past, present, and reasonably foreseeable future actions at Nellis AFB and the NTTR, no significant cumulative effects to air quality would be anticipated to occur under implementation of the Proposed Action.

3.6.3.4 No Action Alternative

Under the No Action Alternative, the Proposed Action as described above would not occur and management of natural resources would continue as characterized in the 2019 INRMP. The Air Force would not receive updated information to inform management decisions on wildland fire, invasive species, endangered species, or on the effects of military activities on natural resources. Over time, the ability of Nellis AFB and the NTTR to develop an appropriate natural resources management framework would diminish, along with the Base's ability to support the military mission while facilitating effective natural resources management and minimizing the impacts of military operations on natural resources. There would be no changes to air quality beyond baseline conditions.

3.6.3.5 Best Management Practices and Mitigation Measures

If project actions result in soil disturbance that exceeds 5 acres in the Northern Range (Nye and Lincoln Counties), Nellis AFB would need to obtain an NDEP Surface Area Disturbance permit, which is required for all disturbances of surface areas greater than 5 acres that are not related to agriculture.

If project actions result in soil disturbance or construction activity that exceeds 0.25 acre or greater or trenching 100 ft or greater, in the Southern Range (Clark County), Nellis AFB would need obtain a Clark County Dust Control Operating Permit.

If any projects exceed 1 acre, Nellis AFB would be required to obtain a NDEP Storm Water Pollution Prevention Plan from the State.

All requirements and soil management techniques outlined in these permits would be followed to minimize impacts to soils to the greatest extent possible.

3.7 WATER RESOURCES

3.7.1 Definition of the Resource

Water resources include surface waters, wetlands, stormwater, groundwater, and floodplains. The *Federal Water Pollution Control Act of 1948*, as amended by the Clean Water Act (CWA), was enacted to protect water resources vulnerable to contamination and quality degradation. The CWA provides the authority to establish water quality standards, control discharges into surface and subsurface waters (including groundwater), develop waste treatment management plans and practices, and issue permits for discharges. A National Pollutant Discharge Elimination System (NPDES) permit under Section 402 of the CWA is required for discharges into navigable waters. The USEPA oversees the issuance of NPDES permits at federal facilities as well as water quality regulations (CWA, Section 401) for both surface- and groundwater.

The ROI for water resources is the Upper Colorado River Basin and the Central Nevada Desert Basin Hydrological Regions of Nevada, Nellis AFB, and NTTR.

3.7.1.1 Surface Waters

The USEPA defines surface waters as waters of the US, which are primarily lakes, rivers, estuaries, coastal waters, and wetlands. Jurisdictional waters, including surface water resources, as defined in 33 CFR § 328.3, are regulated under Sections 401 and 404 of the CWA and Section 10 of the *Rivers and Harbors Act*. Man-made features not directly associated with a natural drainage, such as upland stock ponds and irrigation canals, are generally not considered jurisdictional waters. The CWA regulates discharges of pollutants in surface waters of the US. Section 404 of the CWA established a program to regulate the discharge of dredged and fill material into waters of the US.

3.7.1.2 Wetlands

The US Army Corps of Engineers (USACE) defines wetlands as "those areas that are inundated or saturated with ground or surface water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions" (Environmental Laboratory, 1987). Wetlands generally include swamps, marshes, bogs, and similar areas (33 CFR Part 328). Federal protection of wetlands is also promulgated under EO 11990, *Protection of Wetlands*, the purpose of which is to reduce adverse impacts associated with the destruction or modification of wetlands. This EO directs federal agencies to provide leadership in minimizing the destruction, loss, or degradation of wetlands.

3.7.1.3 Stormwater

Stormwater is surface water runoff generated from precipitation and has the potential to introduce sediments and other pollutants into surface waters. Stormwater is regulated under the CWA Section 402 NPDES program. Impervious surfaces such as buildings, roads, parking lots, and even some natural soils increase surface runoff. Stormwater management systems are designed to contain runoff on site during construction and to maintain predevelopment stormwater flow characteristics following development through either the application of infiltration or retention practices. *Energy Independence and Security Act* (Public Law 110-140) establishes stormwater design requirements for development and redevelopment projects. Under these requirements, federal facility projects larger than 5,000 ft^2 must maintain or restore, to the maximum extent feasible, the predevelopment hydrology of the property with respect to the water temperature, rate, volume, and duration of flow.

3.7.1.4 Groundwater

Groundwater is water that exists in the saturated zone beneath the earth's surface in pore spaces and fractures and includes aquifers. Groundwater is recharged through percolation of water on the ground's surface (e.g., precipitation and surface water bodies) and upward movement of water in lower aquifers through capillary movement. Groundwater is an essential resource that can be used for drinking, irrigation, and industrial processes, and can be described in terms of depth from the surface, aquifer or well capacity, water quality, recharge rate, and surrounding geologic formations. Groundwater quality and quantity are regulated under several different programs. The federal sole source aquifer regulations, authorized under the *Safe Drinking Water Act*, protect aquifers that are critical to water supply.

3.7.1.5 Floodplains

Floodplains are areas of low-level ground along rivers, stream channels, or coastal waters that provide a broad area to inundate and temporarily store floodwater. In their natural vegetated state, floodplains slow the rate at which the incoming overland flow reaches the main water body. Floodplains are subject to periodic or infrequent inundation due to rain or melting snow. The risk of flooding is influenced by local topography, the frequency of precipitation events, and the size and characteristics of the watershed upslope of the floodplain.

The Federal Emergency Management Act (FEMA) evaluates and maps flood potential, which defines the 100-year (regulatory) floodplain. The 100-year floodplain is the area that has a one-percent annual chance of inundation by floodwater. FEMA uses letter designations for flood zone classification. Zone A designates 100-year floodplains where flood depths (base flood elevations) have not been calculated and further studies are needed. Zone AE floodplains include calculated base flood elevations. Base flood elevations are minimum elevation standards for buildings. Zone X indicates areas outside of the FEMA 100-year regulatory floodplain and indicate a low risk of flooding hazards (FEMA, 2020). Federal, state, and local regulations often limit floodplain development to passive uses, such as recreational and preservation activities, to reduce the risks to property and human health and safety.

EO 11988, *Floodplain Management*, provides guidelines that agencies should carry out as part of their decision-making process on projects that have potential impacts to or within the floodplain. This EO requires that federal agencies avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and avoid direct and indirect support of floodplain

development wherever there is a practicable alternative. EO 13690, *Establishing a Flood Risk Management Standard and Process for Further Soliciting and Considering Stakeholder Input*, established a Federal Flood Risk Management Standard and a process for further soliciting and considering stakeholder input; however, this EO was later revoked by Section 6 of EO 13807, *Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure*. EO 13807 did not revoke or otherwise alter EO 11988.

3.7.2 Existing Conditions

3.7.2.1 Surface Waters

Nellis AFB and the NTTR are both located in the northeast portion of the Las Vegas Valley, an intermountain basin of approximately 1,600 square miles within the Basin and Range Province of the US, which extends southeasterly through the Las Vegas Wash into Lake Mead (Nellis AFB, 2019).

Nellis AFB
Within Nellis AFB, natural perennial streams, rivers, springs, or lakes do not occur due to low precipitation, high evaporation rates, and low humidity. Several unnamed ephemeral streams and washes occur on Nellis AFB, including known washes that traverse Nellis AFB (**Figure 3-3**). Most of the ephemeral streams only contain water during infrequent storm events. However, some storm events are intense enough to result in flash flooding of these streams. These streams are connected to navigable waters of the US (i.e., Las Vegas Wash, Lake Mead, and Colorado River) and may be considered jurisdictional by USACE (Nellis AFB, 2019).

Surface water impoundments on Nellis AFB consist entirely of artificially constructed ponds within the Sunrise Vista Golf Course located in the southwestern corner of the Installation. Stormwater drainage channels have been excavated within and adjacent to the airfield, as well as within the residential areas to the west of the airfield. Water within the golf course ponds consists of reclaimed water from the City of North Las Vegas, which is used to maintain the golf course and is regulated by permit.

NTTR
The NTTR is located in a semiarid-to-arid desert region but contains approximately 360 historic seep and spring sites within its boundary, including the three springs identified within Project 2.4.2 (**Figure 3-4**). The surface water that does exist within the NTTR typically consists of alluvial fans, valley collectors, and dry lake beds that may contain water during storm events. Breen Creek, located in the northern portion of the NTTR, has historically contained surface waters. A 2019 survey observed flowing water with amphibian inhabitants during the exceptionally wet season (Nellis AFB, 2019).

3.7.2.2 Wetlands

Nellis AFB
Although there are man-made ponds located on Nellis AFB's Sunrise Vista Golf Course, these ponds are not subject to wetlands protection under the CWA because they are man-made, artificially filled with treated groundwater, are isolated, and do not connect to other water bodies (USACE, 2020). The remainder of the Installation is arid scrub or developed land that contains no jurisdictional or non-jurisdictional wetlands (Nellis AFB, 2019).

NTTR
As noted above, large numbers of historic seep and spring sites have been recorded at the NTTR. In 2019, 13 of the 360 known sites were surveyed for wetland characteristics. Two sites, Breen Creek and Roller Coaster Seep #1, were given wetland status by the USACE based on the characteristics of riparian vegetation and surface water found on site. The remaining 11 sites evaluated did not receive wetland status due to a lack of surface water, recent signs of rainfall, sign of any hydrophytic vegetation, and or did not meet the criteria of hydrophytic soils to meet USACE wetlands standards. Breen Creek and Roller Coaster Seep #1 will be continually evaluated at regular intervals to determine progression or regression of their wetland status (Nellis AFB, 2019).

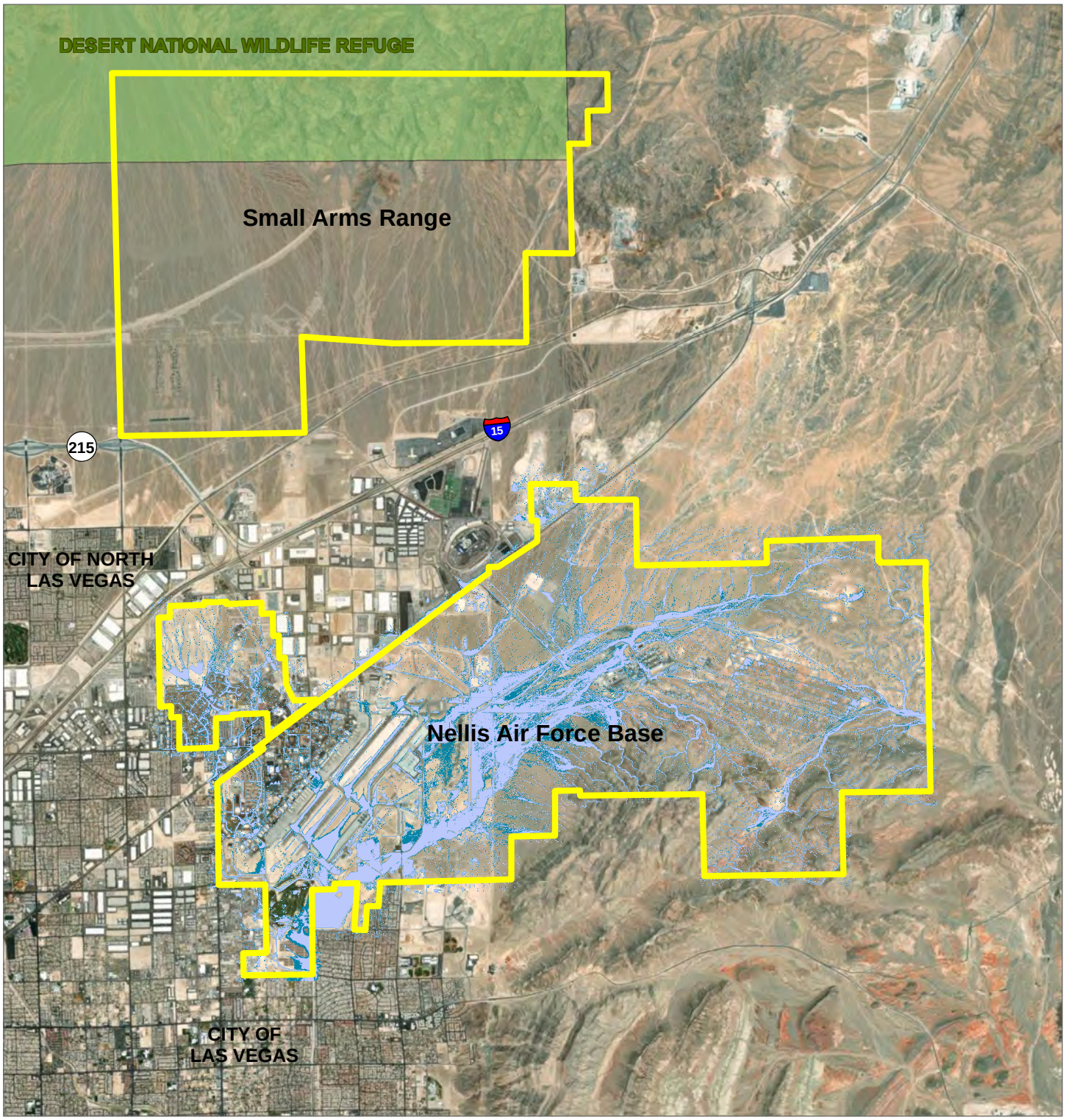


FIGURE 3-3
Nellis AFB Water Resources

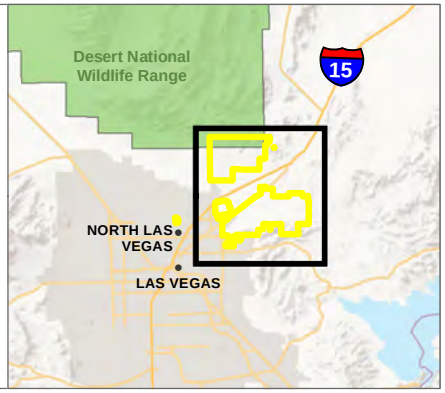
100-Year Floodplain

500-Year Floodplain

N

0 1.25 2.5 Miles

Imagery: ESRI, 2021.
Coordinate System: NAD 83 UTM Zone 11N



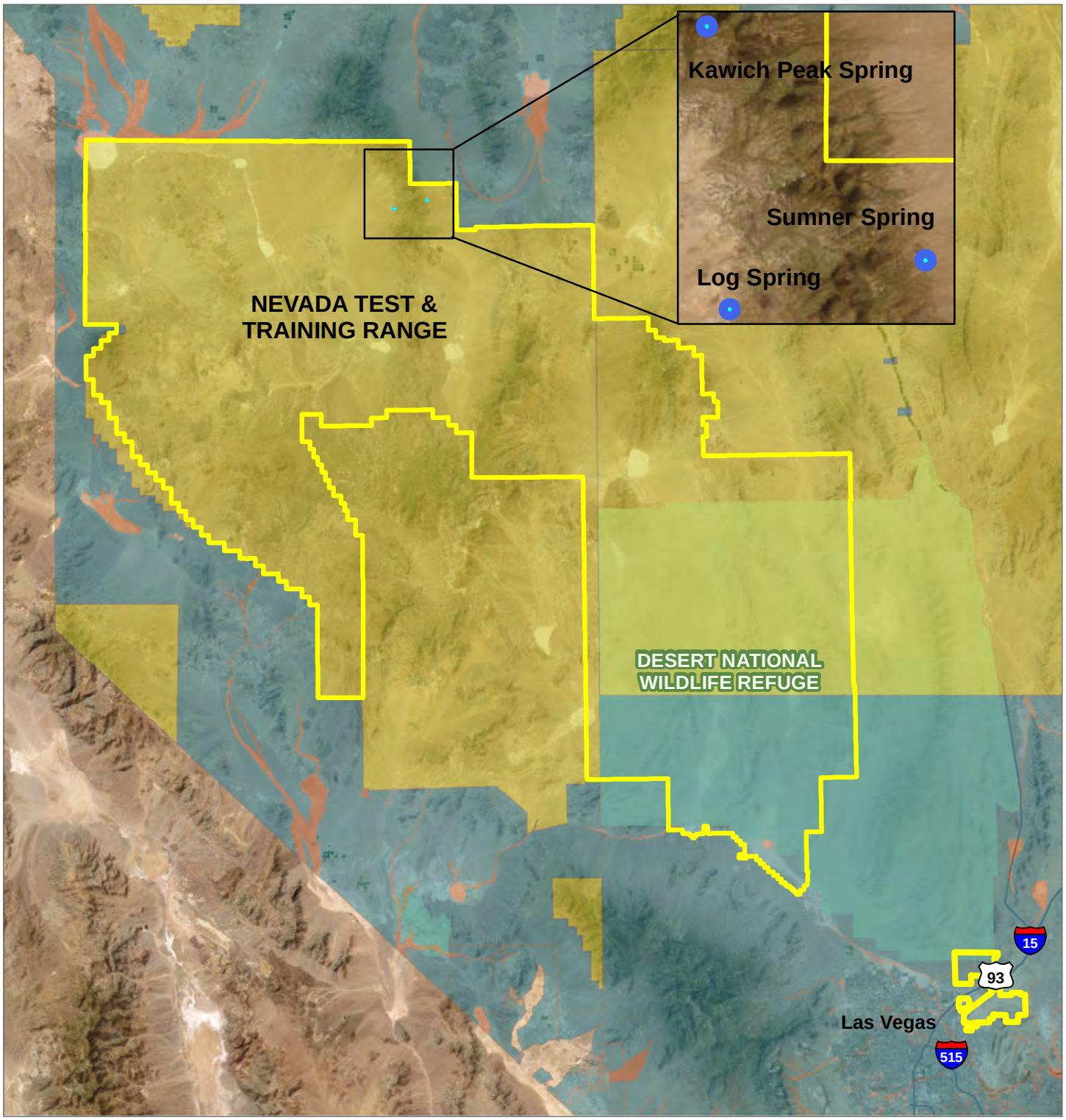


FIGURE 3-4
NTTR Water Resources

Springs Proposed for Exclusionary Fencing

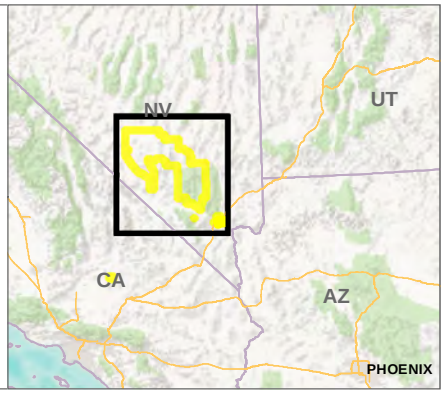
Area of Minimal Flood Hazard

Flood Risk Not Quantified (no survey)

N

0 15 30 Miles

Coordinate System: NAD 83 UTM Zone 11N



3.7.2.3 Stormwater

Nellis AFB

In accordance with NPDES regulations, Nellis AFB is required to obtain coverage under a stormwater permit and has been issued coverage under the Nevada Industrial Stormwater General Permit based on the types of industrial activities conducted. According to the Nellis Stormwater Pollution Prevention Plan, construction activities comprising one or more acres are excluded from the Nevada Industrial Stormwater General Permit and must obtain their own state-issued general permit for stormwater discharges.

Stormwater drainage channels have been excavated within and adjacent to the airfield, as well as within the residential areas to the west of the airfield. These channels facilitate the flow of stormwater from the Installation into Clark County Regional Flood Control District channels, which in turn divert stormwater from Nellis AFB into the Las Vegas Wash.

Despite the dry climate and infrequent rainfall in the area, stormwater events tend to be significant and intense in the Nellis AFB area. With the combination of the rainfall intensity and the region's soil impermeability, flooding is a major concern. Stormwater throughout Nellis AFB generally flows southeasterly via washes and ultimately empties into Lake Mead and the Colorado River. Severe thunderstorms can result in temporary flash flooding, and water sources have the potential to become contaminated. Because of the flow path, and the connection other ephemeral streams and washes have with the Las Vegas Wash, implementation of BMPs would be required to reduce stormwater pollution (Nellis AFB, 2019).

NTTR

Stormwater conveyance occurs in the NTTR in the form of mountain runoff, piedmont plains, and/or base-level plains or alluvial valleys. While some powerful storms pass through the region, generating 4 to 16 inches of rainfall a year, most of the precipitation evaporates quickly. Flash floods are common when more intense storms occur because of the low infiltration potential of the soil. Some storms generate flash floods or snowpack in higher elevations (Nellis AFB, 2020c). Stormwater within NTTR does not flow beyond lake beds and instead stays within closed basins.

3.7.2.4 Groundwater

Nellis AFB

In the Las Vegas Valley, groundwater is protected from contaminants by a thick layer of clay and fine-grained sediments. More than 6,000 wells in the Las Vegas Valley provide year-round groundwater to residents and other users who are not on municipal supply (Las Vegas Valley Water District, 2021). While the main drinking water source for Nellis AFB is Lake Mead, wells on and near the Base supplement the drinking water supply (Nellis AFB, 2011). Due to Nevada's climate and scarcity of water in the Las Vegas Valley, Nellis AFB has implemented strict groundwater conservation measures to ensure that the use of this resource is mitigated and monitored.

NTTR

The NTTR is located in a largely undisturbed area of the carbonate-rock province of the Great Basin (Nellis AFB, 2020c). Carbonate rocks are highly permeable, supporting large groundwater and aquifer systems. The NTTR is additionally associated with the Death Valley regional flow system, which primarily consists of fractured carbonate and volcanic rock. The Death Valley system relies heavily on snowmelt from nearby ranges to support aquifer recharge as precipitation typically results in evaporation and evapotranspiration (Nellis AFB, 2020c). There are 62 underground water resources within the NTTR and nine permitted water-supply wells. A 2019 survey at Breen Creek in the northern portion of the NTTR observed flowing water during the exceptionally wet season (Nellis AFB, 2019b). However, recent drier periods have resulted in a water table that is below the surface of the riparian corridor.

3.7.2.5 Floodplains

Nellis AFB
Nellis AFB lies within the Upper Colorado River Basin Hydrological Region of Nevada. The portion of the watershed in which Nellis AFB is located is characterized by few perennial streams and numerous ephemeral washes that drain to the Las Vegas Wash (Nellis AFB, 2019).

Local rainstorms can be severe enough to cause flash flooding, generating an increase in flood risk due to impermeable surfaces. Developed nonporous surfaces increase flood risk by increasing the volume and flow rate of stormwater in localized areas. Stormwater flows through ephemeral streams, resulting in washes that often create small, localized floodplains known as alluvial fans. In these areas, soil tends to be more friable, and erosion due to water movement is usually higher than in the surrounding areas. Alluvial fans are potentially jurisdictional surface water features and are located throughout Nellis AFB.

Available floodplain data from FEMA is limited. Colorado State University (CSU) has conducted supplemental research to identify floodplains within Nellis AFB. CSU estimates 3,886 acres of 500-year and 2,585 acres of 100-year floodplains within Nellis AFB (CSU, 2021) (**Figure 3-3**).

NTTR
A 1996 study provided initial floodplain analysis in which surface waters within the NTTR showed features of alluvial fans, valley collectors, and dry lake beds or playa lakes. Extensive floodplain delineation conducted by FEMA has not yet occurred on the NTTR.

3.7.3 Environmental Consequences

3.7.3.1 Evaluation Criteria

Evaluation criteria for potential impacts on water resources are based on water availability, quality, and use; existence of floodplains; and associated regulations. Potential adverse impacts to water resources would occur if the Proposed Action:

- reduces water availability or supply to existing users,
- overdrafts groundwater basins,
- exceeds safe annual yield of water supply sources,
- adversely affects water quality,
- endangers public health by creating or worsening health hazard conditions, or
- violates established laws or regulations adopted to protect sensitive water resources.

3.7.3.2 Proposed Action

Surface Water
The implementation of projects and objectives under Goals 1, 3, 4 and 5 of the Proposed Action would have no potential to impact existing surface waters.

Under Goal 2, Project 2.4.2 would install exclusionary fences around the Kawich Peak Spring, the Sumner Spring, and the Log Spring within the NTTR, resulting in short-term, negligible, adverse impacts to surface waters during construction. Project 2.4.2 would be anticipated to result in long-term, beneficial impacts to surface waters by allowing the springs and seeps to maintain a natural state and reducing damage associated with use by wild horses and burros. Projects 2.8.1, 2.8.2, and 2.8.3 would conduct wetland delineations, water testing, installation of soil moisture sensors, and ongoing monitoring. These projects would result in long-term beneficial impacts to surface waters by providing Nellis AFB staff with information needed to develop management plans for these resources. All remaining projects under Goal 2 would have no potential to impact surface waters.

Wetlands
The implementation of projects and objectives under Goals 1, 3, 4, and 5 of the Proposed Action would have no potential to impact groundwater resources.

Under Goal 2, Project 2.8.1 would conduct surveys to perform wetland delineations, including the testing of water parameters and hydrological status at seeps and springs within the NTTR. Long-term, beneficial impacts to wetlands would be expected to occur as a result of this project due to an expanded inventory of wetland resources and continued monitoring and management of the resource. All remaining projects under Goal 2 would have no potential to impact wetlands.

Stormwater
The implementation of projects and objectives under Goals 1, 3, 4, and 5 of the Proposed Action would have no potential to impact existing stormwater resources.

Under Goal 2, Project 2.11.1 could impact stormwater if the project resulted in an increase in impervious surfaces or disturbed a large footprint of existing soil. At this time, Nellis AFB has not determined the exact size, location, and design of Project 2.11.1. If the proposed project footprint exceeds 5,000 ft^2, contractors would be required to maintain or restore, to the maximum extent feasible, the predevelopment hydrology of the property with respect to the water temperature, rate, volume, and duration of flow. With implementation of these measures, Project 2.11.1 would not be anticipated to result in long-term impacts to stormwater resources. All remaining projects under Goal 2 would have no potential to impact stormwater resources.

Groundwater
The implementation of projects and objectives under Goals 1, 3, 4, and 5 of the Proposed Action would have no potential to impact groundwater resources.

Under Goal 2, Project 2.8.2 would conduct a survey of groundwater resources on the NTTR. Long-term, beneficial impacts would result from surveys as the NTTR would be better able to identify and describe groundwater quantity and locations. All remaining projects under Goal 2 would have no potential to impact stormwater resources.

Floodplains
The implementation of projects and objectives under the Proposed Action would have no potential to impact floodplains at Nellis AFB or the NTTR.

3.7.3.3 Cumulative Impacts

The Proposed Action would improve knowledge of the status and locations of water resources within the NTTR and Nellis AFB. Long-term, beneficial impacts to water resources would occur under the Proposed Action. Concurrently, Nellis AFB is preparing an EIS for the development of the east side of the Base. Such development would be anticipated to result in an increase of 1,480 acres of additional impervious surfaces (EAS, 2023b). Increased runoff from impervious surfaces during stormwater events would have the potential to contribute to increased impacts to stormwater and surface water. Projects occurring under this Proposed Action would not contribute to an increase in impervious surfaces. When considered in conjunction with other past, present, and reasonably foreseeable future actions at Nellis AFB and the NTTR, significant, beneficial cumulative impacts to water resources would be anticipated to occur with implementation of the Proposed Action, while increased impervious surfaces associated with the Nellis AFB EIS would have the potential to generate adverse cumulative impacts to water resources at Nellis AFB.

3.7.3.4 No Action Alternative

Under the No Action Alternative, the Proposed Action as described above would not occur and management of natural resources would continue as characterized in the 2019 INRMP. Surveys regarding locating of water resources, wetlands, and ground water would not occur. Restoration of natural seeps and springs, along with reducing the harmful impacts to seeps and springs from native horses and burros through the installation of exclusionary fencing, would not occur. Over time, the ability of Nellis AFB and

the NTTR to develop an appropriate natural resources management framework would diminish, along with the Base's ability to support the military mission while facilitating effective natural resources management and minimizing the impacts of military operations on natural resources.

3.7.3.5 Best Management Practices and Mitigation Measures

If the proposed environmental appreciation park footprint exceeds 5,000 ft^2, contractors would be required to maintain or restore, to the maximum extent feasible, the predevelopment hydrology of the property with respect to the water temperature, rate, volume, and duration of flow.

3.8 BIOLOGICAL RESOURCES

3.8.1 Definition of the Resource

Biological resources include native or invasive plants and animals; sensitive and protected floral and faunal species; and the associated habitats, such as wetlands, forests, grasslands, cliffs, and caves in which they exist. Habitat can be defined as the resources and conditions in an area that support a defined suite of organisms. The following is a description of the primary federal statutes that form the regulatory framework for the evaluation of biological resources.

The ROI for biological resources includes Nellis AFB and the NTTR.

3.8.1.1 Endangered Species Act

The ESA established protection for threatened and endangered species and the ecosystems upon which they depend. Sensitive and protected biological resources include plant and animal species listed as threatened, endangered, or special status by the USFWS. The ESA also allows the designation of geographic areas as critical habitat for threatened or endangered species. Under the ESA, an "endangered species" is defined as any species in danger of extinction throughout all, or a large portion, of its range. A "threatened species" is defined as any species likely to become an endangered species in the foreseeable future. The USFWS maintains a list of candidate species being evaluated for possible listing as threatened or endangered under the ESA. Although candidate species receive no statutory protection under the ESA, the USFWS has attempted to advise government agencies, industry, and the public that these species are at risk and may warrant protection in the future under the ESA.

3.8.1.2 Migratory Bird Treaty Act

The MBTA makes it unlawful for anyone to take migratory birds or their parts, nests, or eggs unless permitted to do so by regulations. Per the MBTA, "take" is defined as "pursue, hunt, shoot, wound, kill, trap, capture, or collect" (50 CFR § 10.12). Birds protected under the MBTA include nearly all species in the US except for non-native/human-introduced species and some game birds.

EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, requires all federal agencies undertaking activities that may negatively impact migratory birds to follow a prescribed set of actions to further implement the MBTA. EO 13186 directs federal agencies to develop a Memorandum of Understanding with the USFWS that promotes the conservation of migratory birds.

The *National Defense Authorization Act for Fiscal Year 2003* (Public Law 107-314, 116 Stat. 2458) provided the Secretary of the Interior the authority to prescribe regulations to exempt the armed forces from the incidental take of migratory birds during authorized military readiness activities. Congress defined military readiness activities as all training and operations of the US armed forces that relate to combat and the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use. Further, in October of 2012, the Authorization of Take Incidental to Military Readiness Activities was published in the Federal Register (50 CFR § 21.15), authorizing incidental take during military readiness activities unless such activities may result in significant adverse effects on a population of a migratory bird species.

In December 2017, the US Department of the Interior issued M-Opinion 37050, which concluded that the take of migratory birds from an activity is not prohibited by the MBTA when the purpose of that activity is

not the take of a migratory birds, eggs, or nests. On August 11, 2020, the US District Court, Southern District of New York, vacated M-37050. Thus, incidental take of migratory birds is again prohibited. The interpretation of the MBTA remains in flux, and additional court proceedings are expected.

3.8.1.3 Bald and Golden Eagle Protection Act

The *Bald and Golden Eagle Protection Act of 1940* (16 USC §§ 668–668c) (BGEPA) prohibits actions to "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle [or any golden eagle], alive or dead, or any part, nest, or egg thereof." Further, the BGEPA defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb," and "disturb" is defined as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, injury to an eagle, a decrease in productivity by substantially interfering with the eagle's normal breeding, feeding or sheltering behavior, or nest abandonment by substantially interfering with the eagle's normal breeding, feeding, or sheltering behavior." The BGEPA also prohibits activities around an active or inactive nest site that could result in disturbance to returning eagles.

3.8.1.4 Invasive Species

Invasive species are non-native species whose introduction causes or is likely to cause economic or environmental harm, or harm to human, animal, or plant health. EO 13751, Safeguarding the Nation from the Impacts of Invasive Species, requires federal agencies to identify actions that may affect invasive species; use relevant programs to prevent introductions of invasive species; detect, respond, and control such species; monitor invasive species populations; and provide for restoration of native species. Invasive species damage native habitat and impede successful vegetation management by outcompeting native species.

3.8.2 Existing Conditions

Nellis AFB and the NTTR are located in the southwestern portion of the Great Basin Desert in southern Nevada. Approximately 50 percent of the Nellis Main Base is directly impacted by mission activities, while approximately 10 percent of the SAR is directly impacted by mission activities. Nellis AFB is bordered by the Lake Mead National Recreation Area to the east, and the SAR overlaps with the Desert National Wildlife Refuge to the north. The available undeveloped areas within the Main Base and SAR and proximity of the SAR to the wildlife refuge has allowed the native ecosystem to remain relatively healthy.

Approximately 5 percent of the land area of the NTTR is directly impacted by mission activities. Because of high security levels that allow little to no public access, about 2.7 million acres of the NTTR are largely undisturbed by human activities. As a result, the ecological communities within the NTTR are less affected by human activity than similar ones in the surrounding region, leading to a variety of healthy plant and animal communities that continue to be conserved within the NTTR's boundaries (Nellis AFB, 2019).

3.8.2.1 Vegetation

Nellis AFB

The vegetative communities on Nellis AFB outside of the developed areas consists of mostly of creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*) communities (Nellis AFB, 2019). Creosote bush/white bursage communities are characteristic of much of the Mojave desert at elevations ranging from below sea level to approximately 3,940 feet, and they can be observed in less-developed areas of Nellis AFB, such as in the eastern portion of Area II and the SAR. Traditionally, non-native drought-tolerant deciduous trees and shrubs, evergreen trees and shrubs, perennials, ground covers, vines, and grasses have also been planted throughout the Base; however, over the past several years the focus has been on planting native vegetation. Introduced native and non-native vegetation are contained mostly within and adjacent to developed areas at the Base (Nellis AFB, 2019).

NTTR

The NTTR is within a vegetation transition zone encompassing both the Great Basin Desert and the Mojave Desert. The South Range generally encompasses an area that supports vegetation and habitat types that

are characteristic of the Mojave Desert; whereas the North Range generally encompasses an area that supports vegetation and habitat types characteristic of the Great Basin Desert. The vegetation transition zone between the Great Basin Desert and the Mojave Desert represents an important region because it supports a greater diversity of plant and animal species. (Beatley, 1976)

The Mojave Desert is among the driest of North America's arid lands, where precipitation is often less than 4 inches per year. Creosote bush/white bursage and saltbush communities are the most common vegetation communities on the South Range. Vast areas of the basins and bajadas in the Mojave Desert, below approximately 3,940 ft, support plant communities dominated by creosote bush and white bursage. Saltbush species, ephedras (*Ephedra spp.),* brittlebush (*Encelia virginensis*), desert mallow (*Sphaeralcea ambigua*), cacti (especially prickly pears and chollas [*Opuntia* spp.]), and Mojave yucca (*Yucca shidigera*) may also occur in this community. At higher elevations (approximately 3,940 ft to 5,900 ft) blackbrush often is the dominant plant in the community. This plant community includes blackbrush (*Coleogyne ramosissima*), ephedras, turpentine-broom (*Thamnosma montana*), and range ratney (*Krameria parvifolia).* Joshua tree (*Yucca brevifolia*) is another plant that may occur at higher elevations within the creosote bush-white bursage and the blackbrush communities. (Nellis AFB, 2018a)

The sagebrush/pinyon-juniper community comprises a woodland that is present on NTTR and is distinctive of the higher elevations of the Mojave and Great Basin Deserts above at least 4,920 ft elevation, and usually above 5,900 ft. At these higher elevations, increased precipitation and lower temperatures facilitate the development of this woodland habitat. The dominant species include big sagebrush (*Artemisia tridentata*), single-leaf pinyon and Utah juniper in habitats with deeper soils, and black sagebrush (*A. nova*) in areas with shallow, rocky soils. Joint fir (*Ephedra viridis*) and rabbitbrush species (*Chrysothamnus* spp.*)* are common sub-dominants in this woodland. (Nellis AFB, 2018a)

The Great Basin Desert floristic region winter temperatures are too low to support plants typical of the warmer deserts of the Southwest, such as creosote bush. The vegetation of the basin floors of the North Range is typified by shadscale and greasewood (*Sarcobatus vermiculatus*). Intermediate elevation slopes are dominated by Great Basin mixed desert scrub characterized by various species of horsebrush (*Tetradymia* spp.), rabbitbrush (*Chrysothamnus nauseosus, C. viscidiflorus*), hopsage (*Grayia spinosa*), greasewood, shadscale, and sagebrush (typically budsage, *Artemisia spinescens*). With increasing elevation, the predominance of junipers and pinyons increases with an understory of black sagebrush. Other species that occur in this community include rabbitbrush, joint fir, and occasional Joshua tree. Greasewood may occur as a co-dominant with sagebrush. The blackbrush community reaches its northernmost limit on upper bajadas below the western face of the Groom Range mountains (Beatley, 1976). Elsewhere, blackbrush vegetation occurs in the southerly portions of the North Range at intermediate elevations between the shadscale community and sagebrushpinyon- juniper community. The dominant vegetation in the North Range mountains above 4,920 ft elevation is sagebrush-pinyon-juniper woodland. White fir (*Abies concoloi*) occurs at elevations above approximately 8,200 ft on Bald Mountain in the Groom Range (Beatley, 1976), with single-leaf pinyon and limber pine (*Pinus flexilis*).

3.8.2.2 Wildlife

Nellis AFB

Bird species with the potential to occur at Nellis AFB include species typically associated with Mojave Desert scrub ecosystems. Species present in bajada communities (i.e., hillside alluvial fans formed by mountain runoff) within Nellis AFB include common raven (*Corvus corax*), horned lark (*Eremophila alpestris*), loggerhead shrike (*Lanius ludovicianus*), mourning dove (*Zenaida macroura*), sage sparrow (*Amphispiza belli*), black-throated sparrow (*Amphispiza bilineata*), burrowing owl (*Athene cunicularia*), golden eagle (*Aquila chrysaetos*), bald eagle (*Haliaeetus leucocephalus*), greater roadrunner (*Geococcyx californianus*), lesser nighthawk (*Chordeiles acutipennis*), and Gambel's quail (*Callipepla gambelii*). In areas where Joshua trees, riparian vegetation, and cacti are present, bird species diversity increases, to include cactus wren (*Campylorhyncus brunneicapillus*), Scott's oriole (*Icterus spurius*), phainopepla (*Phainopepla nitens*), ashthroated flycatcher (*Myiarchus cinerascens*), and blacktailed gnatcatcher (*Polioptila melanura*) (Nellis AFB, 2019).

Common reptiles known to occur at Nellis AFB include side-blotched lizard (*Uta stansburiana*), western whiptail (*Cnemidophorous tigris*), zebra-tailed lizard (*Callisaurus draconoides*), yellow-backed spiny lizard

(*Sceloporus uniformis*), desert horned lizard (*Phyronosoma platyrhinos*), coachwhip (*Coluber flagellum*), western patch-nosed snake (*Salvadora hexalepis*), gopher snake (*Pituophis catenifer*), (Nellis AFB, 2019). Amphibians are scarce within the Installation. The most common species include Woodhouse's toad (*Anaxyrus woodhousii*), commonly found near man-made perennial water sources (e.g., golf course ponds) (Stebbins, 2003).

The only fish species known to occur on Nellis AFB are non-native koi (*Cyprinus* spp.) and carp (*Cyprinus carpio*), which were introduced to ponds on the Sunrise Vista Golf Course (Nellis AFB, 2019). Numerous arthropods occur in the Mojave Desert, and arthropods can be abundant and diverse in urban landscapes such as Nellis AFB (McIntyre et al., 2001). Arthropods within the Mojave Desert are represented by insects including the orders Coleoptera (beetles), Lepidoptera (butterflies and moths), Diptera (flies), Orthoptera (grasshoppers and crickets), Hymenoptera (bees, wasps, and ants), Arachnids (mites, spiders, and tarantulas), Opiliones (harvestmen), Pseudoscorpions (pseudoscorpions), Scorpiones (true scorpions), Ricnulei (hooded tickspiders), and Thelyphonida (vinegarroons and tailed whip scorpions).

NTTR

Bird species typically found in sagebrush communities at lower altitudes include the sage thrasher (*Oreoscoptes montanus*), sage sparrow (*Amphispiza befit*), and horned lark (*Eremophila alpestris*). Less frequently observed species include the mourning dove (*Zenaida macroura*), greater roadrunner, common nighthawk (*Chordeiles minor*), western meadowlark (*Stumella neglecta*), and common raven (*Corvus corax*). The pinyon-juniper woodlands support the greatest bird diversity in the NTTR area. Common species include the blue-gray gnat catcher (*Polioptila caerulea*), gray vireo (*Vireo vicinior*), blackthroated gray warbler (*Dendroica nigrescens*), juniper titmouse (*Baeolophus ridgway*), gray flycatcher (*Empidonax wrightii*), pinyon jays (*Gymnorhinus cyanocephalus*), Townsend's solitaire (*Myadestes townsendi*), and the house finch (*Carpodacus mexicanus*).

Several bat species are known to inhabit the NTTR included the long-legged myotis (*Myotis volans*), fringe-tailed myotis (*M. thysanodes*), California myotis (*M. califomicus*), pipstrelle (*Pipistrellus hespereus*), Townsend's big-eared bat (*Plecotus townsendit*), and pallid bat (*Antrozous pallidus*).

Reptiles are common across the entire NTTR and Nellis AFB, while amphibians are scarce and only found in areas containing perennial sources of water. The most common amphibians found in NTTR are the Great Basin spade-foot toad (*Spea intermontana*) on the North Range and the western toad (*Bufo boreas*). Reptiles are less abundant in the North Range, probably due to the colder climate. Common reptiles found in NTTR include the desert tortoise (Gopherus agassizii), side-blotched lizard (*Uta stansburiana*), tiger whiptail (*Cnemidophorous tigris*), zebra-tailed lizard (*Callisaurus draconoides*), desert spiny lizard (*Sceloporus magister*), chuckwalla lizard (*Sauromalus obesus*), and the desert horned lizard (*Phyrnosoma platyrhinos*). Common snakes include the coach whip (*Coluber flagellum*), western patch-nosed snake (*Salvadora hexalepis*), gopher snake (*Pituophis melanoleucus*), western shovel-nosed snake (*Chionactis occipitalis*), and the sidewinder rattlesnake (*Crotalus cerastes*). On the North Range, additional reptile species have been observed and include the Great Basin fence lizard (*Sceloporus occidentalis*), Long-nosed leopard lizard (*Gambelia wisilenil*), and Great Basin rattlesnake (C*rotalus organus lutosus*) (Nellis AFB, 2018a).

Mule deer, pronghorn, desert bighorn, and mountain lions are prominent large mammal species found on NTTR. Common small mammals found on NTTR include the coyote (*Canis latrans*), red fox (*Vulpes fulva*), gray fox (*Urocyon cinereoargenteus*), badger (*Taxisdea taxus*), black-tailed jackrabbit (*Lepus californicus*), desert kit fox (*Vulpes macrotis*), and bobcat (*Lynx rufus*) (Nellis AFB, 2018a).

3.8.2.3 Threatened or Endangered Species and Other Protected Species

Threatened or endangered species are species that have federal status and protection under the ESA. Other protected species includes birds protected under the MBTA or BGEPA, and Nevada state-listed and classified species, as well as Nevada SGCN.

Threatened or Endangered Species

Appendix C of this EA presents a list of threatened or endangered species that may occur within Nellis AFB or the NTTR. Of particular concern is the Mojave desert tortoise, which is listed as federally threatened and is known to occur within Nellis AFB and the NTTR. Tortoise conservation and mitigation measures are

outlined within the September 2023 *Programmatic Biological Opinion for Nellis Air Force Base and Small Arms* (USFWS, 2023) and 2018 *Programmatic Biological Opinion for the NTTR* (USFWS, 2018).

The monarch butterfly (*Danaus plexippus*) is a candidate species for the ESA and migrates seasonally in the spring and fall through Nevada, which is part of the butterfly's summer breeding area. The primary threat to the monarch includes habitat loss and degradation due to conversion of grasslands to agriculture, herbicide use, changes to the ecosystem and natural environment in overwintering areas due to human activity, drought, urban development, insecticides, and the effects of climate change. Additionally, as milkweed is a crucial part of their breeding habits, they are threatened by a loss of this plant in their breeding areas, as well as by losses of nectar-producing plants (87 *Federal Register* 26,169).

Migratory Birds

Migratory birds within Nellis AFB and the NTTR include burrowing owls, various raptors, pinyon jays and various other migratory species.

Both bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) have been documented on Nellis AFB and the NTTR, but bald eagles are typically only observed while passing over the area during migration. The NTTR does not contain any suitable bald eagle wintering habitat and is outside of their breeding range. Golden eagles are known to occur on the NTTR. Suitable habitat for nesting and foraging occurs throughout the region.

Other Protected Species

Various other state-sensitive species and Base-defined candidate species are located on the Nellis AFB and the NTTR. Several INRMP projects will be focused on surveying and monitoring these species to inform management and future listing decisions. These species include but are not limited to the Mojave fringe-toed lizard (*Uma scoparia*), the Mojave poppy bee (*Perdita meconis*), and the western bumble bee (*Bombus occidentalis*).

3.8.2.4 Invasive Species

Euro-American settlement in the area now occupied by the NTTR led to the introduction of non-native annual and perennial plants, some of which overtake native vegetation and are considered invasive.

Nellis AFB

State listed invasive plants known to inhabit Nellis AFB include salt cedar (*Tamarix* spp), Sahara mustard (*Brassica tournefortii*), and Malta starthistle (*Centaurea melitensis*). Other well established invasive species that are not federally or state listed and that have been detected on Nellis AFB include: cheatgrass (*Bromus tectorum*), red brome (*B. rubens*), salt lover (*Halogeton glomeratus*), and Russian thistle (*Salsola tragus*).

NTTR

The three most prominent annual invasive species found in the North Range are Russian thistle (*Salsola tragus*), red brome (*Bromus rubens*), and cheatgrass (*Bromus tectorum*) (Nellis AFB, 2019). Red brome is more common in the South Range, while cheatgrass is more common in the cooler North Range. Cheatgrass specifically threatens native vegetation in both the Sagebrush and Intermountain Cold Desert Shrub habitats. All three will spread rapidly and can out-compete native annual plant populations in areas where soil has been disturbed. While Russian thistle will usually not persist if there is no further soil disturbance, red brome and cheatgrass can continue to dominate in certain habitats (Nellis AFB, 2019). The introduction of these three species has increased the amount of flammable fuels in the vegetation communities and the potential spread of wildland fire in some locations. Additionally, while no federally listed noxious weeds were found on the NTTR during a 2016 survey, one state-listed weed, the salt cedar (*Tamarix* spp), was identified (Nellis AFB, 2019).

Invasive wildlife known to occur on the NTTR include the wild horse (*Equus ferus*) and the wild burro (*Equus asinus*).

Invasive species management on the NTTR is guided by the National Invasive Species Management Plan, *Federal Noxious Weed Act* (7 USC 2814), the NRS for the Control of Insects, Pests, and Noxious Weeds (NRS 555.005–555.201), and the Nellis AFB Integrated Pest Management Plan.

3.8.3 Environmental Consequences

3.8.3.1 Evaluation Criteria

The level of impact on biological resources is based on the following:

- importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource;
- proportion of the resource that would be affected relative to its occurrence in the region;
- sensitivity of the resource to the proposed activities; and
- duration of potential ecological impact.

Adverse impacts on biological resources would occur if the Proposed Action negatively affects species or habitats of high concern over relatively large areas or if estimated disturbances cause reductions in population size or distribution of a species of high concern.

As a requirement under the ESA, federal agencies must provide documentation that ensures that the agency's proposed actions would not adversely affect the existence of any threatened or endangered species. The ESA requires that all federal agencies avoid "taking" federally threatened or endangered species (which includes jeopardizing threatened or endangered species habitat). Section 7 of the ESA establishes a consultation process with the USFWS that ends with either a no effect determination by the federal agency or a Biological Opinion from the USFWS that the Proposed Action either would or would not jeopardize the continual existence of a species.

3.8.3.2 Proposed Action

Figures 3-5 and **3-6** show the biological resources within the context of the Proposed Action for Nellis AFB and the NTTR, respectively.

Vegetation
Projects occurring under Goal 3 would not be anticipated to result in notable impacts to vegetation. The majority of projects under the Proposed Action would broadly benefit vegetation by providing updated information regarding vegetation, gathering data to inform vegetation management decisions, and improving conditions for vegetation across Nellis AFB and the NTTR. Direct impacts from individual projects are enumerated below.

Project 1.4.12 would include survey of milkweed to monitor for monarch activity and habitat, while Project 1.4.13 would identify locations on the Base where milkweed could be planted. These projects would provide a long-term beneficial impact by providing Nellis AFB with additional information on the status of milkweed and potentially expanding the areas in which milkweed exists. Projects 1.6.1, 1.6.2, and 1.6.3 would monitor for sensitive plant species to inform future management and protection for Las Vegas bearpoppy, Las Vegas buckwheat, and other rare plants. These projects would result in long-term beneficial impacts to sensitive plant species by providing additional information that could be used to protect existing vegetation.

Project 2.1.3 focuses on reducing foot traffic in known locations of the Las Vegas bearpoppy in order to protect the plant and its host, the Mojave poppy bee. This project would result in long-term beneficial impacts to vegetation by protecting the Las Vegas bearpoppy. Project 2.4.1 would conduct habitat restoration on a case-by-case basis after events, which would provide a long-term beneficial impact to vegetation by returning damaged areas to their natural state. Project 2.4.4 would conduct cleanup of trash and refuse within the Area III Conservation Area, providing a long-term beneficial impact by improving conditions for vegetation. Project 2.5.1 would determine a conservation strategy to protect populations of sensitive and rare plant species, including, but not limited to, the Las Vegas bearpoppy, Las Vegas buckwheat, and other species. Protection of the Area III Conservation Area, in which many of these species are located, would provide long-term beneficial impacts to these species. Projects 2.6.1 and 2.6.2

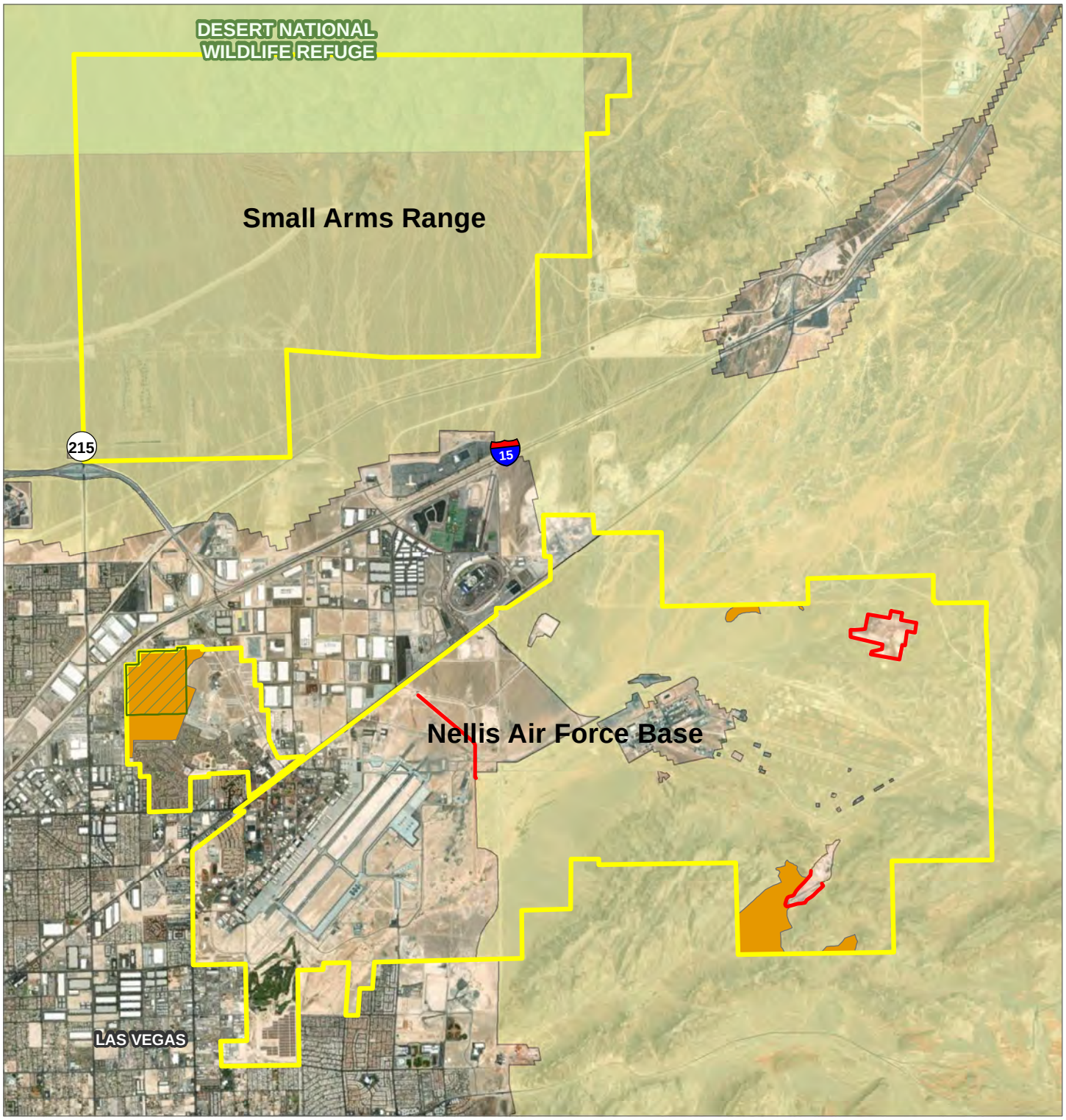


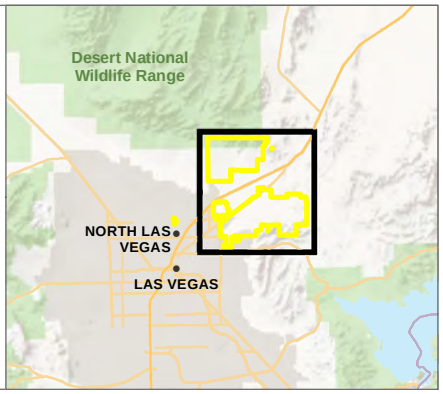
FIGURE 3-5
Nellis AFB Biological Resources

- Existing Tortoise Exclusion Fencing
- Nellis Air Force Base Installation Boundary
- Proposed Environmental Appreciation Park
- Desert Tortoise Habitat
- Las Vegas Bearpoppy Habitat
- Desert National Wildlife Refuge

N

0 1 2 Miles

Imagery: ESRI, 2021.
Coordinate System: NAD 83 UTM Zone 11N



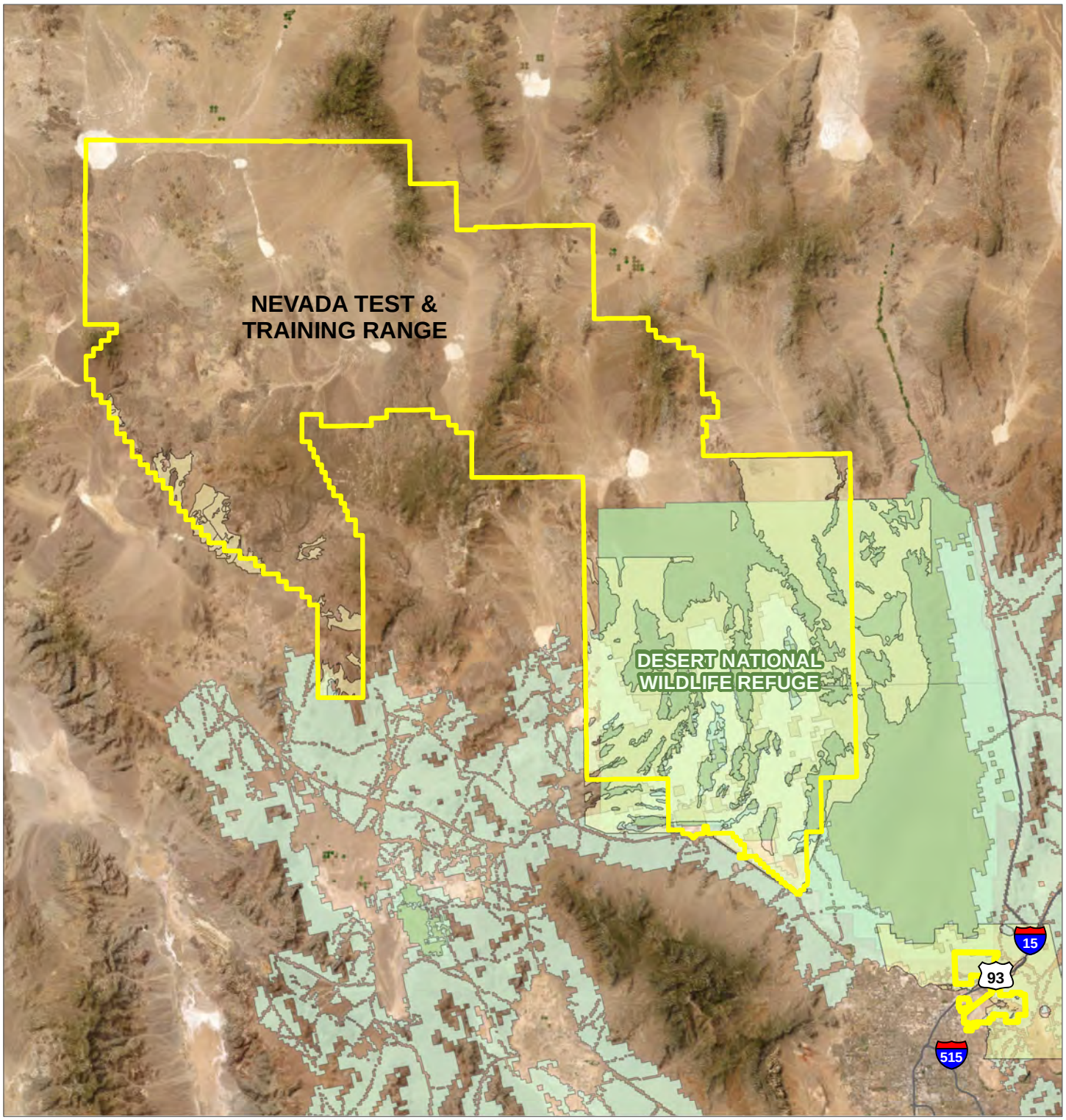


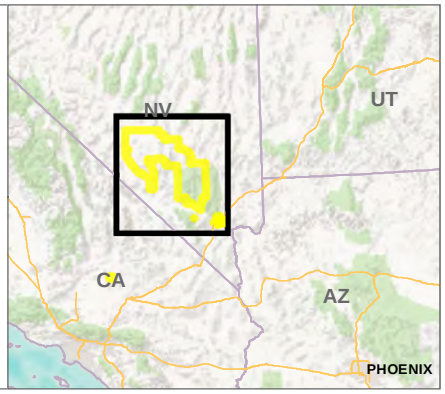
FIGURE 3-6
NTTR Biological Resources

- Desert Tortoise Habitat
- FWS Desert Tortoise Connectivity Areas
- Desert National Wildlife Refuge

N

0 12.5 25 Miles

Coordinate System: NAD 83 UTM Zone 11N



would assess and mitigate the impacts of disturbance on vegetation communities, providing a long-term beneficial impact by allowing Nellis AFB to effectively manage these communities and restore these communities where appropriate. Project 2.6.3 would identify areas of the NTTR with no plans for further active use, such as roads, two-tracks, and areas infested with invasive species, and assess their potential for restoration, providing a long-term beneficial impact to native vegetation in these areas. Projects 2.7.1–2.7.6 would conduct vegetation classification and ground-truthing surveys, resulting in a long-term beneficial impact by providing Nellis AFB with improved information regarding vegetation communities. Projects 2.8.1–2.8.3 would monitor water parameters of seep and spring locations on the Base to assess forage opportunities and water availability for native wildlife. This includes 8 days of wetland delineation surveys including up to 6 days of helicopter surveys to reach remote areas. Noise from the helicopter surveys would occur over remote areas and could result in short-term adverse effects to wildlife populations. However, the majority of noise at the NTTR occurs as a result of aircraft operations and wildlife have adapted to the noise. Projects 2.9.1–2.9.7, which focus on monitoring and control of invasive plant species, would have long-term beneficial impacts to native vegetation by reducing the prevalence of invasive species, which often out-compete native species for resources needed to grow. Project 2.11.1 would develop an environmental appreciation park in Las Vegas bearpoppy habitat to benefit the long-term protection of rare plants and other species. This park would provide public access by construction of an elevated boardwalk that protects soil and vegetation and improve public understanding of rare plants, resulting in a long-term beneficial impact. Project 2.11.3 would maintain and enhance the Nellis AFB Tree City USA recognition. This project would result in long-term, beneficial impacts to vegetation by continuing existing urban forestry initiatives and providing landscaping trees along walkways and common areas.

Project 3.2.8 would coordinate with seed collection organizations to collect representative seed samples of plant species found on the NTTR to stabilize, rehabilitate, and restore degraded land. This would result in long-term benefits to the vegetation communities across the NTTR.

Projects 4.1.1–4.1.6 would reduce hazardous fuel accumulation and reduce large-scale infestations of invasive species. Removal of invasive species and hazardous fuel would result in long-term beneficial impacts to vegetation by eliminating competition and reduce threats of catastrophic wildland fire.

Projects under Goal 5 would broadly benefit vegetation by providing updated information regarding vegetation. However, no direct impacts to vegetation would occur.

Wildlife

The majority of projects under the Proposed Action would broadly benefit wildlife by providing updated information regarding wildlife, gathering data to inform wildlife management decisions, and improving conditions for wildlife across Nellis AFB and the NTTR. Direct impacts from individual projects are enumerated below.

Project 1.4.14 includes small mammal live-trapping in order to inform management decisions regarding SGCN. Genetic samples would be collected from selected species of trapped animals, resulting in a short-term, negligible, adverse impact to trapped wildlife. However, long-term beneficial impacts to wildlife would be anticipated to occur as a result of the information gained from sampling, which would be used to inform management decisions. Project 1.4.15 would conduct surveys to document the indirect impacts of wild horses and burros on small mammal communities and would be anticipated to result in long-term beneficial impacts, as Nellis AFB would use the information gained to determine appropriate conservation actions in coordination with BLM regarding horse management. Projects 1.5.1–1.5.4 would survey and monitor bat communities on Nellis AFB and the NTTR to determine their presence and abundance parameters to inform management decisions. These projects would be anticipated to result in long-term beneficial impacts to bat communities as a result of improved management practices resulting from the information obtained through the survey and monitoring.

Projects 1.7.1–1.7.6 include monitoring and survey efforts aimed at conserving bighorn sheep on the NTTR to sustain populations and support management efforts. Monitoring would be completed by using remote cameras, helicopter surveys, and by collaring up to 22 individual bighorn sheep. The capture of bighorn sheep can result in injury and even death to some of the sheep during actual capturing and handling. Additionally, following release, some sheep may die due to capture myopathy. These impacts are anticipated to be short-term and negligible, which would not be anticipated to result in any long-term adverse effects to the species. Nellis AFB would collaborate with NDOW and USFWS to analyze data for

all collaring efforts and inform Air Force and NDOW sheep management. Noise from the helicopter surveys would occur over remote areas and could result in short-term adverse effects bighorn sheep populations. However, the majority of noise at the NTTR occurs as a result of aircraft operations and wildlife have adapted to the noise. Impacts to wildlife from wildlife surveys via helicopter would be temporary and necessary for informing wildlife management decisions. In the long term, these projects would result in beneficial impacts to bighorn sheep as a result of better-informed management decisions and conservation efforts.

Project 1.8.1 would use wildlife cameras to document biodiversity and use and would require helicopter support. Noise from the helicopter surveys would occur over remote areas and could result in short-term adverse effects to wildlife. However, the majority of noise at the NTTR occurs as a result of aircraft operations and wildlife have adapted to the noise. Therefore, the project would be anticipated to result in short-term adverse impacts to wildlife as a result of helicopter noise and long-term beneficial impacts as a result of better-informed management decisions. Projects 1.9.1–1.9.12 would conduct a wide range of surveys and efforts designed to inventory and monitor populations of herpetofauna, pronghorn, mesocarnivores, invertebrates, and mollusks to document population trends and biodiversity to inform management decisions. Surveys would include both cameras and live-trapping various wildlife. Short-term adverse impacts resulting from temporary stress would be incurred by these trapped animals; however, the animals would be handled carefully and released as quick as feasible. Long-term beneficial impacts to wildlife species would be anticipated to occur as a result of the information gained from the surveys, which would be used to inform management decisions. Other projects under Goal 1 would not be anticipated to impact wildlife.

Project 2.4.1 would conduct habitat restoration on a case-by-case basis after events, resulting in long-term beneficial impacts to wildlife that are able to more quickly reinhabit the sites. Project 2.4.2 would install, maintain and monitor exclusionary fences around seeps and springs used by wild horses and burros. While wild horses and burros would have reduced access to these areas, native species of wildlife would experience long-term beneficial impacts as a result of increased access to higher quality habitat. Project 2.4.4, which would include the cleanup of trash within fenced Area III Conservation Area, would result in long-term beneficial impacts to wildlife in the area. Project 2.6.3 would identify areas of the NTTR with no further plans for active use that could be restored to native habitat, providing long-term beneficial impacts to species that would inhabit the area. Project 2.7.6 would conduct a survey of pinyon pine to increase understanding of pinyon-dependent wildlife species such as the pinyon jay. Long-term beneficial impacts to wildlife would be anticipated to occur as a result of informed management decisions made as a result of the survey data. Project 2.10.1 and Project 2.10.2 would monitor for damage occurring as a result of non-native species, such as non-native geckos, wild horses, and burros. Long-term beneficial impacts to native wildlife would be anticipated to occur as a result of control work conducted on non-native species. Project 2.11.2 would develop a simple pollinator monitoring survey that can be conducted by the public. The survey would be anticipated to result in long-term beneficial impacts as a result of increased awareness around the importance of pollinators such as the Mojave poppy bee and the western bumble bee.

Projects 3.2.1–3.2.3 would conduct surveys and monitoring projects for desert bighorn sheep in cooperation with external agencies such as NDOW and USFWS. Long-term beneficial impacts to bighorn sheep populations would be anticipated to occur as a result of the increased understanding and updated management activities that would result from the surveys. Project 3.2.4 would conduct surveys for wild horses and vegetation utilization in order to better understand how to protect vegetation for use by native species; long-term beneficial impacts to native wildlife species would be anticipated to occur as a result. Project 3.2.7 would develop and maintain collaborative relationships with various federal and state agencies, as well as non-governmental organizations to standardize avian surveying and monitoring protocols, contribute to the greater knowledge of bird species occurring on Base, and to increase the capacity for effective habitat management and good stewardship of these bird species across their ranges. Greater knowledge of bird species occurring on the Base would contribute to improved habitat management and good stewardship of the species, resulting in long-term beneficial impacts.

Projects under Goal 4 would broadly benefit wildlife by managing fire across the project areas; however, no direct impacts to wildlife would occur.

Projects under Goal 5 would broadly benefit wildlife by providing updated information regarding wildlife. However, no direct impacts to wildlife would occur.

Threatened or Endangered Species and Other Protected Species

The majority of projects under the Proposed Action would broadly benefit protected or sensitive species by providing updated information regarding populations, gathering data to inform management decisions, and improving conditions for protected species across Nellis AFB and the NTTR. Direct impacts from individual projects are enumerated below.

Projects 1.1.1 and 1.1.2 would conduct surveying and monitoring for desert tortoise. This includes conducting up to 40 field days of surveys for Mojave desert tortoise on Nellis AFB and the NTTR, including up to 6 days of helicopter use for accessing remote areas that cannot be reached by road. Tortoise monitoring would be expanded to include tortoise health assessment measurements, DNA sample collection and analysis, use of very high-frequency radio transmitters and shell-attached global positioning system (GPS) loggers, and application of unique identification tag, as approved by USFWS. Use of radio transmitters would have a small potential of deforming or inhibiting tortoise movement if improperly attached, resulting in a short-term adverse impact to tortoises; however, these instances are rare, especially with adequate training and coordination with USFWS. Long-term beneficial impacts to tortoises would be anticipated to occur as a result of the information gained from the transmitters, which would be used to inform management decisions.

Projects 1.2.1–1.2.3 would conduct surveying and monitoring for golden eagles. This includes up to 8 days of helicopter surveys for nesting golden eagles on the NTTR, and up to 8 days of prey-base surveys on the NTTR such that each survey route is covered twice in the course of the year, once in the spring and once in the fall, to fully capture the prey base availability throughout the year. Noise from the helicopter surveys would occur over remote areas and could result in short-term adverse effects to eagles and other wildlife. However, the majority of noise at the NTTR occurs as a result of aircraft operations and wildlife have adapted to the noise. Therefore, the project would be anticipated to result in short-term adverse impacts to wildlife as a result of helicopter noise and long-term beneficial impacts as a result of better-informed management decisions for golden eagles. The golden eagle projects also include determining the feasibility and utility of attaching GPS transmitters to golden eagle chicks through collaboration with USFWS to inform regional knowledge of eagle movements on and off of the NTTR. Use of GPS transmitters would have a small potential of inhibiting eagle movement or harming the eagles if improperly attached, resulting in a potential adverse impact to the eagles; however, these instances are rare, with adequate training and coordination with USFWS. The long-term beneficial impacts to eagles would be anticipated to occur as a result of the information gained from attaching transmitters, which would be used to inform management decisions.

Projects 1.3.1–1.3.6 would conduct surveying and monitoring of various migratory birds on the NTTR and Nellis AFB. This includes conducting 10 burrowing owl surveys on the NTTR, up to 8 call playback surveys for burrowing owls or other sensitive bird species, and up to 30 stationary point counts on Nellis AFB and the NTTR. Using playback surveys would increase the number of species observed but could result in birds appearing agitated and habituated to prerecorded vocalizations. Some birding groups and conservation organizations have strict policies limiting the use of call playback. However, the use of playback surveys would be anticipated to only result in short-term negligible effects to birds in return for long-term beneficial impacts as a result of better-informed management for migratory birds. Additional projects include surveying up to 3 days for wintering raptors on the North Range of the NTTR and conducting up to 4 days of winter powerline surveys for raptors. Any disturbance to the raptors during these surveys would be anticipated to be short-term and negligible but would have long-term beneficial impacts as a result of better-informed management for raptors. A final migratory bird project includes collaborating with the Partners in Flight Pinyon Jay Working Group to establish a pinyon jay survey protocol to be implemented annually. The collaboration would be helpful to determine an efficient and non-disruptive protocol for monitoring pinyon jays.

Projects 1.4.1–1.4.15 include conducting surveys and monitoring for various state-sensitive fauna and Base-defined candidate species to inform management and future listing decisions. Projects 1.4.1 and 1.4.2 include conducting 30 surveys of established transects for the Mojave fringe-toed lizard and collecting genetic samples from PIT or elastomer tagged lizards and collaborating with NDOW/USGS to conduct

genetic analyses of the Mojave fringe-toed lizard genetic sampling. Genetic samples would be tested from the trapped lizards, resulting in a short-term, negligible, adverse impact to the lizards. However, long-term beneficial impacts to Mojave fringe-toed lizard conservation would be anticipated to occur as a result of the information gained from sampling, which would be used to inform management decisions.

Projects 1.4.3–1.4.7 further expand upon the previous burrowing owl surveys in order to develop a burrowing owl management plan. This includes monitoring nesting burrowing owls on Nellis AFB using up to 50 half days and to investigate usage of wildlife cameras to monitor nesting burrowing owls. It also includes conducting up to 4 days of call playback surveys for burrowing owls on Nellis AFB and up to 4 days of call playback surveys for burrowing owls on the NTTR. Additionally, the project would conduct up to 4 days of color-banding burrowing owls on Nellis AFB. Banding would allow for identification of individual owls and year-to-year monitoring and would allow for collection of genetic samples while banding owls and provide to the USFWS for analysis. Using playback surveys would increase the number of individuals observed but could result in birds appearing agitated and habituated to prerecorded vocalizations. Some birding groups and conservation organizations have strict policies limiting the use of call playback. However, the use of playback surveys would be anticipated to only result in short-term negligible effects to birds in return for long-term beneficial impacts as a result of better-informed management for migratory birds. Similarly, the banding and genetic sampling of the owls could result in resulting in short-term, negligible, adverse impacts to the owls, but would provide long-term beneficial impacts to burrowing owl conservation.

Project 1.4.8 involves determining the feasibility and utility of banding LeConte's and Bendire's thrashers to obtain further information on population demographics and aid in protection and management. The banding would possibly create short-term stress on the thrashers resulting in short-term, negligible, adverse impacts to the thrashers, but would also a long-term benefit to the species in management and conservation.

Projects 1.4.9–1.4.11 include conducting surveys for the Mojave poppy bee and the western bumble bee. This includes conducting an annual survey of known Las Vegas bearpoppy (*Arctomecon californica*) populations and expanded monitoring for the Mojave poppy bee at Flatbud pricklypoppy (*Argemone munita)* locations. These surveys would be conducted on foot and would have no negative impacts; however, they would have long-term benefits for Mojave poppy bee and western bumble bee conservation and management.

Projects 2.1.1–2.1.3 focus on avoiding impacts to threatened, endangered, and sensitive species and communities. Project 2.1.1 involves maintaining comprehensive species lists depicting and describing species locations, population status, native status, regulatory status, rarity, and historical documentation to assist the Air Force in identifying sensitive and protected species, habitats, and communities and directives for conforming to environmental regulations governing those resources. This would provide long-term benefits for Nellis AFB by informing all future management plans and development projects to their effect on the species and habitat within Nellis AFB and the NTTR. Project 2.1.2 would evaluate feasibility of retrofitting powerline features dangerous to raptors on the NTTR, removing raptor nests perched on dangerous powerline features, and erect alternative replacement nest perches. This would provide long-term benefits to raptors on the NTTR by reducing powerline mortalities and long-term benefits to the mission of NTTR by reducing outages caused by raptor nests or strikes, improving powerline infrastructure resiliency. Project 2.1.3 would focus on reducing foot and vehicle traffic in areas with known Las Vegas bearpoppy populations to protect the plant and its host, the Mojave poppy bee, which are both in review for listing under ESA. The construction of the Area III environmental appreciation park with a boardwalk would assist in this goal and would provide long-term benefits to conservation of these species, as well as upgraded outdoor recreation infrastructure for the community.

Projects 2.2.1–2.2.7 and 2.3.1–2.3.3 would mitigate and monitor impacts to the Mojave desert tortoise. This includes establishing monitoring programs by designating areas of Mojave desert tortoise habitat on Nellis AFB and the NTTR, designing a survey schedule capable of identifying changes in density and distribution within these areas, and quantifying potential local impacts to Mojave desert tortoise populations before military activities are implemented. The projects would conduct Mojave desert tortoise education for military personnel and expand and disseminate Mojave desert tortoise awareness materials including an annual Mojave desert tortoise vehicle collision alert via email during high Mojave desert tortoise movement periods. Up to 100 acres would be reseeded annually with native seed in order to improve and restore tortoise

habitat. Tortoise exclusion fences would be installed at new developments and along the rock quarry to reduce mortality events from military activities. New and existing tortoise exclusion fencing would be inspected and promptly repaired as needed. The 5-year plan also calls for a review and update the 2015 desert tortoise management guidelines and for development, production, and installation of road signage for tortoise caution signs and speed limit signs. Projects 2.3.1 and 2.3.2 would include 35 days of pre-project surveys to detect Mojave desert tortoise and nesting birds on Nellis AFB and 15 days of pre-project surveys to detect Mojave desert tortoise and nesting birds on the NTTR. These actions would be used to mitigate impacts to the Mojave desert tortoise from military operations as well as future development projects.

Project 2.5.1 would determine a conservation strategy to monitor and maintain the protected Area III Conservation Area on Nellis AFB to continue to protect populations of Las Vegas bearpoppy, Las Vegas buckwheat, and other species. This would not be anticipated to have any adverse impacts to protected species but would provide a long-term benefits of long-term benefits for Las Vegas bearpoppy, Las Vegas buckwheat, and other species conservation and management.

Projects under Goal 3 would broadly benefit threatened and endangered species developing and maintaining collaborative relationships with federal and state agencies, as well as non-governmental organizations; however, no direct impacts to threatened or endangered species would be anticipated to occur.

Projects under Goal 4 would broadly benefit threatened and endangered species by managing fire across the project areas; however, no direct impacts to wildlife would occur.

Projects under Goal 5 would broadly benefit threatened and endangered species by providing updated information regarding threatened and endangered species. However, no direct impacts to wildlife would occur.

Invasive Species

Project 2.4.2 would install, maintain, and monitor exclusionary fences around springs and seeps used by wild horses and burros to preserve access to these resources for native species. This would result in both short-term and long-term benefits to the native species within the NTTR, and improve native vegetation and water quality, while reversing the soil trampling and denuded overgrazed vegetation caused by wild horses and burros.

Projects 2.9.1–2.9.7 would monitor and control invasive species across Nellis AFB and the NTTR. Surveys would include up to 400 acres and 8 survey days for invasive species on the NTTR annually, and up to 200 acres and 4 survey days for invasive species on Nellis AFB annually. It would also survey approximately 250 acres of roadsides and borrow pits for the Malta star thistle on Nellis AFB. Control of invasives would include application of pre-emergent herbicide to Bromus species infestations on the NTTR, application of herbicides to the road network between Tolicha Peak and Black Mountain, and annual treatment of invasive Sahara mustard, tamarisk, or other non-native invasive species on Nellis AFB Area II, on Nellis Water System Annex, and other sites on Nellis AFB. Additionally, it would continue the pilot study of treating cheatgrass infestations with a carbon source, to include the feasibility and effectiveness of the method, long-term effects on vegetation and carbon cycling, and cost effectiveness. These herbicide applications could result in some negligible short-term effects to native vegetation that are also sprayed; however, it would result in long-term habitat improvement for native vegetation and allow it to compete with the invasive species.

Projects 2.10.1 and 2.10.2 would monitor for non-native, feral, and potentially invasive animal and pest species to ensure early detection of northward or upward range shifts and new introductions. This includes continuing to monitor non-native gecko populations incidental to other herpetological work, and work with partners to determine if control work is necessary and feasible. Additionally, the NTTR would work with BLM partners to document damage to soils, vegetation, and water resources from wild horses and burros, and determine feasible strategies to mitigate the negative effects to native species. In the long term, these projects would be anticipated to improve conditions for native species by providing more information regarding measures required for control of invasive and non-native species.

Soil disturbance associated with excavation and new construction of the Project 2.11.1 environmental appreciation park could create ideal conditions for the establishment of invasive plant species, including

cheatgrass, read brome, and Russian thistle. Ground disturbing activities associated with the environmental appreciation park would occur on previously undeveloped land and the proposed action would have the potential for invasive species to move in during construction. Contractors would be required to utilize BMPs to prevent the potential spread of invasive species during construction.

Projects 3.2.4 and 3.2.5 would conduct rangeland utilization surveys to inform horse and burro management to protect vegetation and water/riparian resources and preserve these for use by native species. Consultation with BLM would be required before initiating invasives species control projects on the North Range of the NTTR and Desert National Wildlife Refuge on the South Range. Any herbicides used would be reviewed for pollinator impacts. This review would ensure that impacts to pollinators would be avoided or minimized. Long-term benefits of herbicide applications would be habitat improvement through a transition back to native vegetation. Conducting biannual meetings between natural resources managers and the Pest Management Office would increase communication and support mutually beneficial on-Base pest management actions, as outlined in Project 3.2.6.

Controlling invasives is especially important for reducing wildfire risk as outlined in Objective 4.1. This includes reducing hazardous fuel accumulation through various treatments. Coordinating wildland fire and invasive species initiatives is important for reducing large-scale infestations of Bromus species to decrease wildfire risks, as described in Projects 4.1.5 and 4.1.6. Projects occurring under Goal 4 would broadly reduce the presence of invasive species by eliminating areas of hazardous fuel accumulation in areas prone to wildfire.

Projects under Goal 5 would broadly benefit invasive species management by providing updated information regarding vegetation. However, no direct impacts to invasive species would occur.

When considering potential effects of all projects proposed under the Proposed Action, the Air Force has determined that implementation of the Proposed Action would have No Effect on the Mojave desert tortoise.

3.8.3.3 Cumulative Impacts

Projects proposed as part of the updated INRMP are considered essential to ensure long-term wildlife and ecosystem viability on Nellis AFB and the NTTR. The targeted surveys and monitoring for threatened, endangered, and sensitive species would inform all future management plans and development projects to their effect on the species and habitat within Nellis AFB and the NTTR. The INRMP projects would support the military mission and avoid development or operational delays by maintaining required federal, state, and local plans and permits, such as biological opinions, the Wildland Fire Management Plan, Bird/wildlife Aircraft Strike Hazard (BASH) Plan, Integrated Pest Management Plan, and associated permits. Implementation of the Wildland Fire Management Plan specifically would help to protect life, property, and resources from wildfire.

Concurrent projects within the NTTR include the NTTR Northern Hub development project. INRMP Project 2.3.2 would include 15 days of pre-project surveys to detect Mojave desert tortoise and nesting birds and construction monitoring for Mojave desert tortoise on the NTTR. These pre-project surveys and construction monitoring would be anticipated to result in a beneficial impact to protected species and sensitive species as a result of increased protection of these species.

Concurrent projects within Nellis AFB include Installation development of the east side and west side of Nellis AFB. NEPA analyses for these separate development projects are ongoing; however, it is expected that development of the east side of Nellis AFB would be anticipated to improve up to 2,000 acres of land and would increase impervious surfaces by 1,480 acres on Nellis AFB (EAS, 2023b). A project of this scope would require additional contractor support to ensure all the minimization measures of the Nellis AFB Programmatic Biological Opinion are observed. Proposed INRMP Project 2.3.1 would include 35 days of additional pre-project surveys to detect Mojave desert tortoise and nesting birds, and construction monitoring for Mojave desert tortoise on Nellis AFB; these surveys and construction monitoring efforts would help to provide vital information regarding Mojave desert tortoise occurrences and potential efforts required to minimize impacts to the species. Additionally, installing exclusionary fencing for tortoise as identified in Project 2.2.7 would also help to minimize impacts associated with proposed development. The pre-project surveys, exclusion fencing, and construction monitoring would help to protect tortoise and other sensitive species during the master plan and installation development of the east side of Nellis AFB.

Projects proposed for installation development on the west side of Nellis AFB would occur in developed areas and would not be anticipated to result in significant cumulative effects to biological resources.

The Proposed Action would improve knowledge of the status and locations of biological resources within the NTTR and Nellis AFB. Long-term, beneficial impacts to biological resources would occur under the Proposed Action. When considered in conjunction with other past, present, and reasonably foreseeable future actions at Nellis AFB and the NTTR, long-term adverse impacts to biological resources would be anticipated to occur as a result of reduced habitat for vegetation and wildlife associated with development of the east and west sides of Nellis AFB, while beneficial cumulative impacts to biological resources would be anticipated to occur with implementation of the Proposed Action.

3.8.3.4 No Action Alternative

Under the No Action Alternative, the Proposed Action as described above would not occur and management of natural resources would continue as characterized in the 2019 INRMP. The Air Force would not receive updated information to inform management decisions on wildland fire, invasive species, endangered species, or on the effects of military activities on natural resources. Over time, the ability of Nellis AFB and the NTTR to develop an appropriate natural resources management framework would diminish, along with the Base's ability to support the military mission while facilitating effective natural resources management and minimizing the impacts of military operations on natural resources.

3.8.3.5 Best Management Practices and Mitigation Measures

Surveys of the known populations of Las Vegas bearpoppy would be conducted in the environmental appreciation park in advance of park design. The footprint of the disturbance would depend on where plants are located and would avoid plants as much as possible. If any impacts will occur. If impacts are anticipated, an incidental take permit would be required before impacting the species. Pre-project surveys for nesting birds would be conducted to avoid impacts to nesting species.

Mojave desert tortoise fencing, pre-project surveys, and construction monitoring should be conducted in accordance with the Biological Opinion in order to comply with the MBTA and ESA.

3.9 CULTURAL RESOURCES

3.9.1 Definition of the Resource

Cultural resources are any prehistoric or historic district, site, building, structure, or object considered important to a culture or community for scientific, traditional, religious, or other purposes. These resources are protected and identified under several federal laws and EOs including the *Archaeological and Historic Preservation Act of 1960*, as amended (54 USC § 300101 et seq.), the *American Indian Religious Freedom Act of 1978* (42 USC § 1996), the *Archaeological Resources Protection Act of 1979*, as amended (16 USC §§ 470aa–470mm), the *Native American Graves Protection and Repatriation Act of 1990* (25 USC §§ 3001–3013), the NHPA, as amended through 2016, and associated regulations (36 CFR Part 800). The NHPA requires federal agencies to consider effects of federal undertakings on historic properties prior to deciding or taking an action and integrate historic preservation values into their decision-making process. Federal agencies fulfill this requirement by completing the NHPA Section 106 consultation process, as set forth in 36 CFR Part 800. NHPA Section 106 also requires agencies to consult with federally recognized American Indian tribes with a vested interest in the undertaking. NHPA Section 106 requires all federal agencies to seek to avoid, minimize, or mitigate adverse effects to historic properties (36 CFR § 800.1(a)).

Cultural resources include the following subcategories:

- Archaeological (i.e., prehistoric or historic sites where human activity has left physical evidence of that activity, but no structures remain standing);
- Architectural (i.e., buildings, structures, groups of structures, or designed landscapes that are of historic or aesthetic significance); and

- Traditional Cultural Properties (TCPs) (resources of traditional, religious, or cultural significance to American Indian tribes).

Significant cultural resources are those listed on the National Register of Historic Places (NRHP) or determined to be eligible for listing. To be eligible for the NRHP, properties must be 50 years old and have national, state, or local significance in American history, architecture, archaeology, engineering, or culture. They must possess sufficient integrity of location, design, setting, materials, workmanship, feeling, and association to convey their historical significance and meet at least one of four criteria for evaluation:

1. Associated with events that have made a significant contribution to the broad patterns of our history (Criterion A);
2. Associated with the lives of persons significant in our past (Criterion B);
3. Embody distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction (Criterion C); and/or
4. Have yielded or be likely to yield information important in prehistory or history (Criterion D).

Properties that are less than 50 years old can be considered eligible for the NRHP under criteria consideration G if they possess exceptional historical importance. Those properties must also retain historic integrity and meet at least one of the four NRHP criteria (Criteria A, B, C, or D). The term “historic property” refers to National Historic Landmarks, NRHP-listed, and NRHP-eligible cultural resources.

For cultural resources analyses, the ROI is defined by the Area of Potential Effect (APE). The APE is defined as the “geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist,” (36 CFR § 800.16(d)) and thereby diminish their historic integrity. The direct and indirect APE for this EA is 50 meters and 800 meters around each project location, respectively.

3.9.2 Existing Conditions

3.9.2.1 Cultural Context

A comprehensive discussion of the prehistoric and historic record for Nellis AFB and the NTTR is well beyond the scope of this EA. The following discussion is intended to be general in nature and does not address the differing opinions and interpretations of other specialists.

Evidence of human occupation in southern Nevada first occurred around 10,000 years ago consisting largely of nomadic hunter gatherers. European settlement of the area began approximately 200 years ago as Spanish/Mexican exploration, then European fur trader exploration approximately 175 years ago. European settlement of the area occurred within 100 years ago and was followed by Southern Nevada Infrastructure Development at the advent of the automobile through to current day.

3.9.2.2 Historic Architectural Properties

Nellis AFB has significant historic ties to the Cold War era (1947–1991) and many of its facilities require review to determine NRHP eligibility. Of the 4,370 structures that Nellis AFB manages, approximately 740 are more than 50 years old, meeting one of the criteria for NRHP eligibility. These structures require an evaluation by an architectural historian to determine eligibility. While these structures meet the age criteria, newer structures may still be eligible for the NRHP due to other criteria such as historic importance. Continued studies are being done to determine all structures eligible or potentially eligible for listing in the NRHP (Nellis AFB, 2017).

Approximately 364 locations on the NTTR have been identified as historic or historic with prehistoric components. This number accounts for only 13 percent of the identified cultural features on the range. The historic use of the range was limited by water availability for agriculture, and limited travel routes. Features of the limited settlements can be found located within the NTTR. Many of these features include remnants of abandoned mines and more than 100 historic towns with architectural features. Seven structures on the NTTR are listed on the NRHP (NTTR, 2018). No historic architectural features are anticipated to be located

within the footprint of any project under the Proposed Action; however, the potential exists for ground survey projects under the Proposed Action to occur within proximity of these resources.

3.9.2.3 Archaeological Properties

A review of existing records from the 2017 ICRMP identified 2,927 previously recorded cultural sites within the Nellis AFB area boundaries, which includes the NTTR. These were identified through over 167,000 acres of previously completed surveys and investigations. According to the 2017 ICRMP, three archaeological resources are located within the APE of the Proposed Action. This includes an examination of the direct APE, within 50 meters of the project, and the indirect APE, a range of approximately 800 meters around the project. Two archaeological resources are located within the direct APE of the proposed project locations, while the remaining one resource is located within the indirect APE.

3.9.2.4 Traditional Cultural Properties

Traditional Cultural Properties (TCPs) may include traditionally used plants and animals, trails, and certain geographic areas. Types of resources that have been specifically identified in recent studies include, but are not limited to, rock art sites; “power” rocks and locations; medicine areas; and landscape features such as specific peaks or ranges, hot springs, meadows, valleys, and caves. In 1996, Nellis AFB created a Native American Program to function as a foundation for government-to-government consultation, as required by several laws and executive orders, for members of 17 tribes with ancestral ties to Nellis AFB and the NTTR. Organizations are included to represent tribal members who are away from their respective reservations but have extensive cultural knowledge about Nellis AFB lands. The tribes are within five cultural groups: the Mojave, Colorado River Indian Tribes, Owens Valley Paiute, Southern Paiute, and Western Shoshone. The group formally provides recommendations to Nellis AFB at the Semi-Annual and Annual Meetings. No TCPs, sacred areas, or traditional-use areas have been identified on Nellis AFB proper; however, sacred archaeological resources are located within Range 77 of the NTTR. The Proposed Action does not include projects specifically programmed for this area; however, ground surveys within NTTR would have the potential to occur within the range. Nellis AFB continues to consult with Tribal Historic Preservation Officers and tribal leaders.

3.9.3 Environmental Consequences

3.9.3.1 Evaluation Criteria

Adverse impacts on cultural resources would occur if the Proposed Action or Alternatives results in the following:

- physically altering, damaging, or destroying all or part of a resource;
- altering characteristics of the surrounding environment that contribute to the resource’s significance;
- introducing visual or audible elements that are out of character with the property or alter its setting;
- neglecting the resource to the extent that it deteriorates or is destroyed; or
- the sale, transfer, or lease of the property out of agency ownership (or control) without adequate enforceable restrictions or conditions to ensure preservation of the property’s historic significance.

For the purposes of this EA, an impact is considered significant if it alters the integrity of a NRHP-listed, eligible, or potentially eligible resource or potentially impacts TCPs.

3.9.3.2 Proposed Action

Historic Architectural Properties
No impacts to historic architectural properties would be anticipated to occur at Nellis AFB or the NTTR under the Proposed Action. Any projects that have the potential to occur within the proximity of historic architectural properties would result in no adverse effect to those resources.

Archaeological Properties
The implementation of projects and objectives under Goals 1, 3, 4 and 5 of the Proposed Action would have no potential to impact cultural resources at Nellis AFB or the NTTR.

Project 2.11.1 could have the potential to impact two archaeological sites that are located within the direct APE of the proposed project as a result of construction and equipment staging activities associated with the installation of a boardwalk and shaded picnic areas. However, while the exact locations of the boardwalk and picnic areas have yet to be determined, the locations of the archaeological resources are known, and Project 2.11.1 would be designed to avoid them. One additional site would also fall within the indirect APE associated with Project 2.11.1. There would be no anticipated adverse impacts to archaeological sites under the Proposed Action. All remaining projects under Goal 2 of the Proposed Action would not have the potential to impact archaeological resources.

In accordance with federal and Air Force regulations, should any previously unknown archaeological artifacts be exposed during construction or any other activities, those activities would cease until an investigation is completed.

Traditional Cultural Properties
No impacts to TCPs would be anticipated to occur at Nellis AFB or the NTTR under the Proposed Action.

3.9.3.3 Cumulative Impacts

The Proposed Action would have no adverse effect on cultural resources at Nellis AFB or the NTTR. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at Nellis AFB and the NTTR, no significant cumulative effects to cultural resources would be anticipated to occur with implementation of the Proposed Action.

3.9.3.4 No Action Alternative

Under the No Action Alternative, the Proposed Action as described above would not occur and management of natural resources would continue as characterized in the 2019 INRMP. The Air Force would not receive updated information on the effects of military activities on natural resources. Over time, the ability of Nellis AFB and the NTTR to develop an appropriate natural resources management framework would diminish, along with the Base's ability to support the military mission while facilitating effective natural resources management and minimizing the impacts of military operations on natural resources.

3.9.3.5 Best Management Practices and Mitigation Measures

Project 2.11.1 would be designed to avoid the two archaeological sites that are located within the direct APE of the proposed project. This would include both construction and equipment staging locations associated with the installation of a boardwalk and shaded picnic areas. Similarly, the locations selected for installation of remote automatic weather stations on the NTTR would also be reviewed to ensure they would be in areas void of archaeological or cultural resources.

3.10 INFRASTRUCTURE, INCLUDING TRANSPORTATION AND UTILITIES

3.10.1 Definition of the Resource

Infrastructure consists of the systems and structures that enable a population in a specified area to function. Infrastructure is wholly man-made, with a high correlation between the type and extent of infrastructure and the degree to which an area is characterized as developed. The availability of infrastructure and its capacity to support more users, including residential and commercial expansion, are generally regarded as essential to the economic growth of an area.

The infrastructure components include utilities, solid waste management, sanitary and storm sewers, and transportation. Utilities include electrical, natural gas, liquid fuel, potable water supply, sanitary sewage/wastewater, and communications systems. Solid waste management primarily relates to the availability of landfills to support a population's residential, commercial, and industrial needs. Sanitary and storm sewers (also considered utilities) include those systems that collect, move, treat, and discharge liquid

waste and stormwater. Transportation is defined as the system of roadways, highways, and transit services in the vicinity of the installation that potentially could be affected by a proposed action.

The ROI for this resource is Nellis AFB and the NTTR.

3.10.2 Existing Conditions

3.10.2.1 Transportation

The Proposed Action would not have the potential to impact the transportation infrastructure at NTTR; therefore, transportation is not further evaluated in this EA.

3.10.2.2 Electricity and Natural Gas

Nellis AFB
Nevada Energy provides the majority of electricity to Nellis AFB through the electrical grid. The remaining energy is provided by a large solar array stationed on Nellis AFB owned by Nevada Energy, which was completed and became fully operational in 2015. The system encompasses approximately 140 acres and contains approximately 70,000 solar panels. In 2019, the production of the solar array equaled 26.474 gigawatts per hour (Energy Information Administration, 2021). The electric system at Nellis AFB has the capacity to meet current and future mission needs (Nellis AFB, 2018a).

NTTR
The Cedar Peak Electric line runs along the northern boundary of the NTTR. This area is undeveloped and plant life presents hazardous fuel accumulation, particularly in high-value areas. Electrical utilities exist on the NTTR compound, but the NTTR is largely undeveloped and uninhabited.

The Proposed Action would not have the potential to impact the natural gas system on Nellis AFB or the NTTR; therefore, the natural gas system is not further evaluated in this EA.

3.10.2.3 Liquid Fuel Storage

The Proposed Action would not have the potential to impact liquid fuel storage at Nellis AFB or the NTTR; therefore, liquid fuel storage is not further evaluated in this EA.

3.10.2.4 Potable Water Supply

The Proposed Action would not have the potential to impact potable water at Nellis AFB or the NTTR; therefore, the potable water supply is not further analyzed in this EA.

3.10.2.5 Sanitary Sewer System and Stormwater Channels

The Proposed Action would not have the potential to impact the sanitary sewer or stormwater channel systems at Nellis AFB or the NTTR; therefore, these resources are not further analyzed in this EA.

3.10.2.6 Solid Waste Management

Nellis AFB

On average, Nellis AFB generates 2,704 tons per year of nonhazardous waste (Nellis AFB, 2018a). Solid waste is taken to an approved landfill by Republic Services, where there is sufficient capacity to meet current and future mission needs.[4]

NTTR
The Proposed Action would not impact solid waste management at the NTTR; therefore, solid waste management at NTTR is not further analyzed in this EA.

[4] Landfill Methane Outreach Program, https://www.epa.gov/lmop/lmop-landfill-and-project-database

3.10.3 Environmental Consequences

3.10.3.1 Evaluation Criteria

Impacts on infrastructure are evaluated for their potential to disrupt or improve existing levels of service in the ROI as well as generate additional requirements for energy or water consumption and impacts to resources such as sanitary sewer systems and solid waste management.

Adverse transportation impacts would occur if a proposed action resulted in a substantial increase in traffic that would cause a decrease in the level of service, a substantial increase in the use of the connecting street systems or mass transit, or if onsite parking demand would not be met by projected supply. Adverse impacts related to utilities/services would occur if a proposed action required more than the existing infrastructure could provide or required services in conflict with adopted plans and policies for the area.

3.10.3.2 Proposed Action

Electricity

The implementation of projects and objectives under Goals 3 and 5 of the Proposed Action would have no potential to impact existing electrical infrastructure.

Project 1.3.4 would conduct winter surveys for the presence of raptors along powerlines on Nellis AFB and the NTTR. This action would not involve any physical disturbance of the lines and would not impact existing or future capacity to meet the Base's needs. All remaining projects under Goal 1 would have no potential to impact electrical infrastructure.

Project 2.1.2 would evaluate the potential to retrofit powerline features on the NTTR that are currently presenting dangers to raptors on the NTTR and would erect alternate nest perches as a replacement. Project 2.1.2 would result in a long-term, beneficial impact to the reliability of electrical service in these areas by proactively evaluating and eliminating hazards to the power lines. All remaining projects under Goal 2 would have no potential to impact electrical infrastructure.

Project 4.1.1 would clear 150 acres of hazardous fuel accumulation from the Cedar Peak Powerline along the northern boundary of the NTTR (**Figure 3-7**). The clearing would reduce the risk of wildland fire to high-value powerlines. Project 4.1.1 would also clear trees underneath powerlines every few years based on a BLM schedule to reduce the risk of wildland fire and improve the reliability of the existing electrical infrastructure at NTTR. All remaining projects under Goal 4 would have no potential to impact electrical infrastructure.

Solid Waste Management

The implementation of projects and objectives under Goals 1, 3, 4 and 5 of the Proposed Action would have no potential to impact solid waste management.

Project 2.4.4 would conduct cleanup of trash refuse within the fenced Area III Conservation Area. The removal of trash would assist in cleanup and remediation of areas that are critical to protected-species habitat and wildlife corridors. Republic Services has sufficient capacity to remove the additional waste that would be generated by this project. All remaining projects under Goal 2 would have no potential impact to solid waste management.

3.10.3.3 Cumulative Impacts

The concurrent Installation development project on the east side of Nellis AFB would result in the installation of up to 224 acres of utilities and infrastructure improvements including power lines, underground utility lines, and power substations (EAS, 2023b). Nellis AFB would work with utility providers to ensure that new power lines installed under the proposed development of the east side of Nellis AFB would be designed to avoid features dangerous to raptors and would erect alternative replacement nest perches if necessary. Installation of new underground electrical and water infrastructure related to the NTTR Northern Hub development project would result in upgraded electrical systems. When considered in conjunction with other

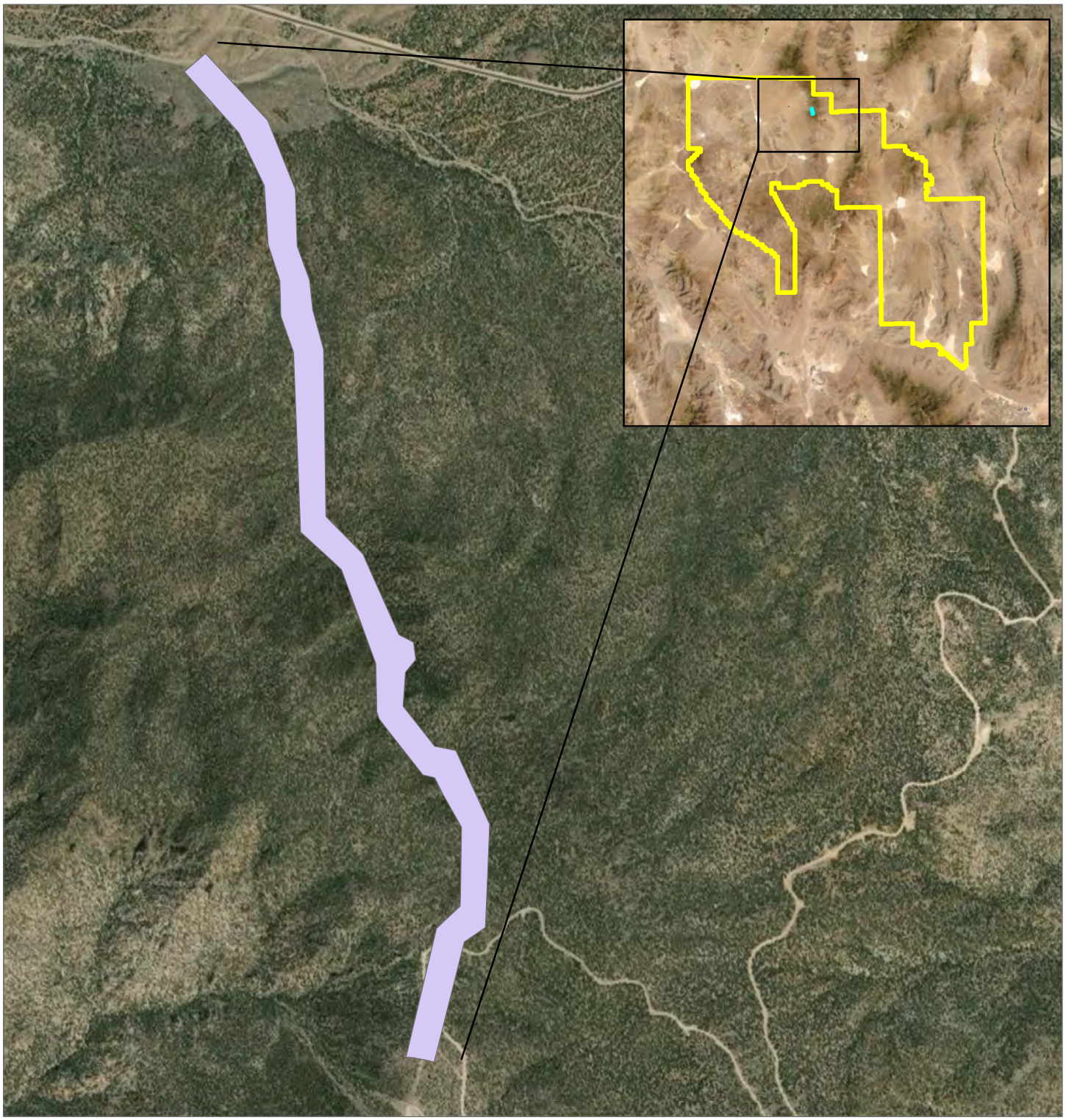


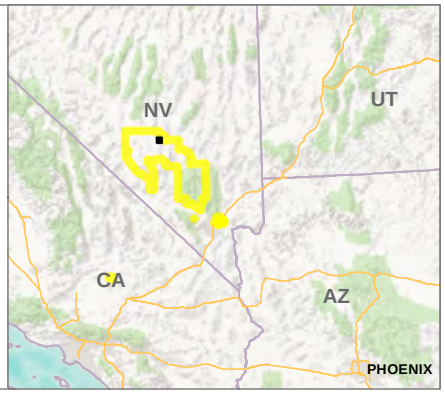
FIGURE 3-7
NTTR Infrastructure

Cedar Peak Powerline 150 foot buffer

N

0 0.2 0.4 Miles

Coordinate System: NAD 83 UTM Zone 11N



past, present, and reasonably foreseeable future actions at Nellis AFB and the NTTR, beneficial, long-term cumulative effects on infrastructure, specifically the electricity system, would occur with implementation of the Proposed Action.

3.10.3.4 No Action Alternative

Under the No Action Alternative, the Proposed Action as described above would not occur and management of natural resources would continue as characterized in the 2019 INRMP. The Air Force would not receive updated information on the effects of military activities on natural resources. There would be no improvements to the hazardous conditions present to the raptor populations. Hazardous fuel accumulation under the Cedar Peak power line infrastructure would not be cleared, leaving the infrastructure susceptible to wildland fire. Long-term adverse impacts would be expected to continue as a result of leaving brush and hazardous accumulation surrounding the electric infrastructure as is. Over time, the ability of Nellis AFB and the NTTR to develop an appropriate natural resources management framework would diminish, along with the Base's ability to support the military mission while facilitating effective natural resources management and minimizing the impacts of military operations on natural resources.

3.10.3.5 Best Management Practices and Mitigation Measures

No infrastructure BMPs or mitigation measures are required.

3.11 SAFETY AND OCCUPATIONAL HEALTH

3.11.1 Definition of the Resource

This section discusses safety and occupational health concerns associated with ground, flight, and explosives activities. Ground safety considers safety issues associated with ground operations and maintenance activities that support unit operations. Ground safety also considers the safety of personnel and facilities on the ground that may be placed at risk from flight operations in the vicinity of the airfield and in the airspace. Clear Zones (CZ) and Accident Potential Zones (APZs) around the airfield restrict the public's exposure to areas where there is a higher accident potential. Flight safety considers aircraft risks such as midair collisions, bird/wildlife aircraft strike hazards, and in-flight emergencies. Explosives safety relates to the management and safe use of ordnance and munitions.

The ROI for this resource area is Nellis AFB and the NTTR.

3.11.2 Existing Conditions

3.11.2.1 Ground Safety

Ground safety includes ground and industrial operations and motor vehicle use. Ground mishaps can occur from the use of equipment or materials and from construction, demolition, and maintenance functions. Ongoing Air Force safety programs covering industrial activities, operation of motor vehicles and other equipment, and everyday operations are continuously refined as new activities and new information becomes available. All Aircrew receive regular safety training to keep the chances of mishaps as low as possible.

All construction contractors operating on Nellis AFB and the NTTR must follow ground safety regulations to avoid posing any risks to workers or personnel on or off Base. Construction contractors are responsible for reviewing potentially hazardous workplace operations, monitoring exposure to workplace chemicals (e.g., asbestos, lead, HAZMAT), physical hazards (e.g., noise propagation, slips, trips, falls), and biological agents (e.g., infectious waste, wildlife, poisonous plants).

Within the NTTR, Nellis AFB maintains a Wildland Fire Management Plan (Nellis AFB, 2020b). This plan contains the procedures and directives necessary in the event that an aircraft mishap or accidental fire from aircraft operations or training occurs within the NTTR. The plan also lays out various Memoranda of Agreement with the City of North Las Vegas and the BLM that define roles and responsibilities in the event

of a wildland fire in the NTTR. Additionally, the plan specifies ways to reduce the likelihood of fire within the NTTR through actions such as fuel reduction and fuel moisture monitoring.

3.11.2.2 Flight Safety

The potential for aircraft mishaps during flight is a public concern with regard to flight safety. Incidents may occur as a result of midair collisions, collisions with man-made structures or terrain, mechanical failure, weather-related accidents, pilot error, or BASH.

The safety of the public with respect to aircraft operations at Nellis AFB and the NTTR is a primary concern for the Air Force. The areas surrounding the Installation have established AICUZ guidelines to define those areas with the highest potential for aircraft accidents and aircraft noise impacts, and to establish flight rules and flight patterns that will have the least impacts on the civilian population with regard to safety and noise effects. For potential aircraft accidents, CZs and APZs have been established to identify areas with the greatest risk for aircraft accidents and to guide or minimize off-Base development in these higher-risk areas (**Figure 3-8**). The CZs and APZs also restrict incompatible land use and thereby reduce exposure to hazards within and adjacent to the runway. Guidance for BASH reduction in areas on both Nellis AFB and the NTTR where flight operations are conducted is provided by the Nellis AFB, Creech AFB, and NTTR Bird/Wildlife Aircraft Strike Hazard Plan 17, effective January 2016.

Nellis AFB
Wildlife represents a significant hazard to flight operations and BASH occurrences can cause structural and mechanical damage to aircraft. One potential concern for BASH issues at Nellis AFB is the Sunrise Vista Golf Course, which is situated at the southern end of the Nellis AFB runway and includes ponds, watered turf, and trees that attract various bird species. The proximity of the runway to the golf course and bird-friendly habitat results in the ongoing potential for collisions between birds and aircraft. Additionally, runways on the Installation are not fully fenced off, making them easily accessible for prey animals like black-tailed jackrabbits and desert cottontails which in turn attract large raptors.

NTTR
In areas of the NTTR where raptor activity has the potential to impact aircraft operations, the Nellis Natural Resources Program surveys for and monitors golden eagles and other cliff nesting raptor nests. Golden eagle nesting surveys were completed in 2021 on both the North and South Ranges via helicopter, and nesting raptor surveys have been completed intermittently over approximately the last 15 years (Nellis AFB 2022a, 2022b).

3.11.2.3 Explosives Safety

Aircraft and weapon munitions include ammunition, propellants (solid and liquid), pyrotechnics, warheads, explosives devices, and chemical agent substances and associated components that present real or potential hazards to life, property, or the environment. Defense Explosive Safety Regulation 6055.09_Air Force Manual 91-201 (DESR6055.09_AFMAN) 91-201, *Explosives Safety Standards*, defines the guidance and procedures dealing with munition storage and handling (AFMAN, 2023).

Operational constraints are primarily associated with explosive safety quantity distance (ESQD) arcs, munitions storage, and transportation routes. ESQD arcs are defined distances from explosives storage that prevent development within their extents. There are no ESQD arcs, munitions storage concerns, or transportation routes involved in the Proposed Action; therefore, explosives safety is not evaluated further in this EA.

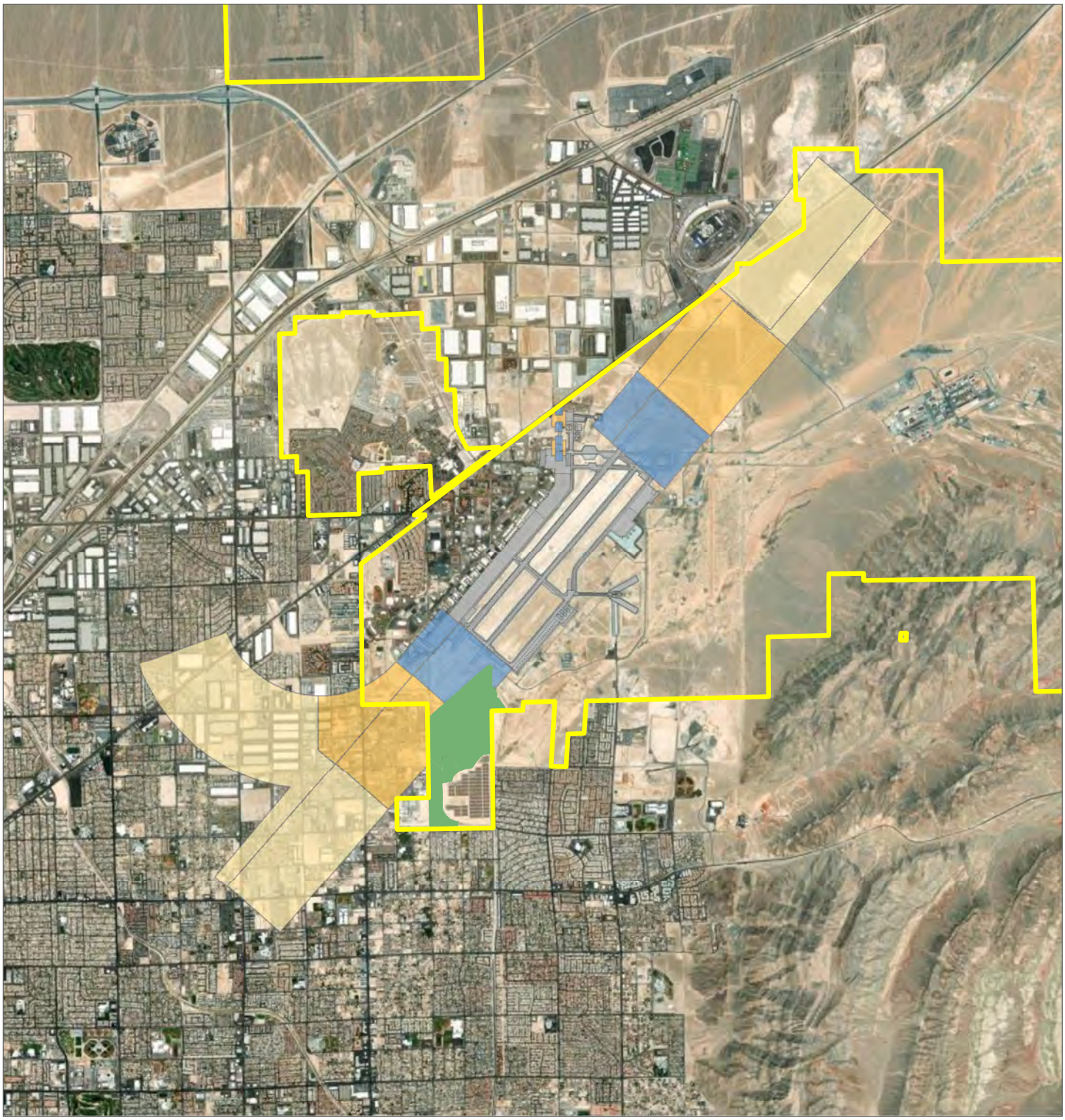


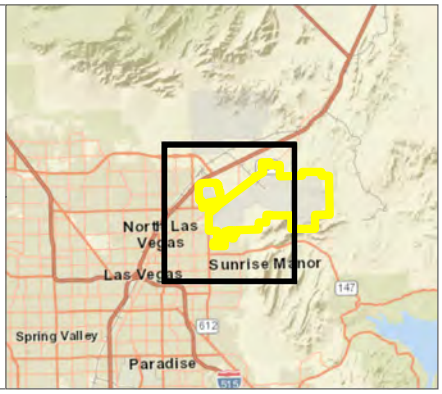
FIGURE 3-8
Safety

Nellis Air Force Base
Airfield Surface
APZ I
APZ II
Clear Zone
Golf Course

N

0 0.5 1 Miles

Coordinate System: WGS 1984 UTM Zone 11N



3.11.3 Environmental Consequences

Under 40 CFR § 989.27, the EIAP for an action must assess direct and indirect impacts of the proposed action and alternatives on the safety and health of Air Force employees and others at a work site. Air Force Policy Directive 91-2, *Safety Programs,* is implemented by AFI 91-202, *The US Air Force Mishap Prevention Program*, which manages risks to protect Air Force personnel from occupational deaths, injuries, or illnesses and minimize loss of Air Force resources. These standards apply to all Air Force activities; adherence to the Air Force's Mishap Prevention Program ensures Air Force workplaces meet federal safety and health requirements.

3.11.3.1 Evaluation Criteria

Safety-related impacts from a proposed activity are assessed according to the potential to increase or decrease safety risks to personnel, the public, property, or the environment. Adverse impacts related to safety would occur if the Proposed Action or Alternatives resulted in Air Force Occupational Safety and Health Administration (OSHA) criteria being exceeded or the improper implementation of established or proposed safety measures, creating unacceptable safety risk to personnel. Adverse impacts would occur if the activities:

- substantially increase risks associated with the safety of construction personnel, contractors, military personnel, or the local community;
- substantially hinder the ability to respond to an emergency; or
- introduce a new health or safety risk for which the Base is not prepared or does not have adequate management and response plans in place.

3.11.3.2 Proposed Action

Ground Safety
The implementation of projects and objectives under Goal 1 of the Proposed Action would have no potential to impact the existing ground safety environment.

Project 2.2.6, which would develop, produce, and install road signage for tortoise caution and speed limits, would have long-term beneficial impacts on ground safety by encouraging safe motor vehicle operation and discouraging speeding. Project 2.4.1 would have long-term, beneficial impacts on ground safety as habitat restoration efforts would likely involve removing invasive plants that are not native to the local ecosystem, thereby reducing the amount of potential wildfire fuel. Projects 2.9.3 and 2.9.4, which would apply herbicides to existing populations of invasive species, would have long-term beneficial impacts on ground safety by controlling and reducing infestations of invasive plants, thereby reducing the amount of potential fuel available for wildfires (BLM, 2023). Project 2.9.4 would also create a fire break which would have long-term beneficial impacts on ground safety by slowing and/or stopping potential wildfires. All remaining projects under Goal 2 would have no potential to impact ground safety.

Project 3.1.2, maintenance of a Wildland Fire Management Plan and review of the Memorandum of Understanding (MOU) with cooperators for fire suppression assistance, would have long-term beneficial impacts on ground safety by ensuring that the Wildland Fire Management Plan is accurate and current, and that the MOU is in order in case of a wildland fire event. All remaining projects under Goal 3 would have no potential to impact ground safety.

Projects 4.1.1–4.1.4, which include treatment of hazardous fuel accumulation across various areas of the NTTR, would have long-term, beneficial impacts on ground safety by reducing potential wildfire fuel and therefore directly reducing wildfire risk across the NTTR. Project 4.1.6, coordination of initiatives to reduce large-scale infestations of Bromus species to reduce wildfire risks, would have long-term beneficial impacts on ground safety by reducing large-scale infestations of invasive species which serve as hazardous fuel accumulation for wildfires. Project 4.1.7, collaboration with BLM on the mapping of sensitive resources and establishment of minimization during firefighting activities, would have long-term, beneficial impacts on ground safety by ensuring that proper measures are clearly outlined and available for use by Incident

Command staff in the event of a wildfire, which would allow them to perform firefighting activities as safely as possible. All remaining projects under Goal 4 would have no potential to impact ground safety.

Project 5.1.2, updating and acquisition of high-resolution aerial imagery every 5 years, would have long-term, beneficial impacts on ground safety by providing the Air Force with updated information on the location and status of various resources that could be relevant in case of wildfires in terms of areas/resources that are vulnerable to fires, are at high-risk for fires, or are in need of fuel reduction activities. Sharing this with partner agencies upon request would also allow those agencies to be better informed and prepared for wildfire management in the event of an emergency. Project 5.1.3 would have long-term, beneficial impacts on ground safety by providing accurate and detailed information on potential fire ignition sources which would allow for better levels of wildfire risk management and preparedness. All remaining projects under Goal 5 would have no potential to impact ground safety.

Flight Safety

The implementation of projects and objectives under Goals 1, 2, 4 and 5 of the Proposed Action would have no potential to impact the existing flight safety environment.

Projects 3.1.3 and 3.1.4, obtaining and maintaining relevant permits to support BASH and collaborating with the 57th Wing Flight Safety to share BASH information, would have long-term beneficial impacts on flight safety by ensuring that the necessary permits and plans are in place to properly manage BASH, and that accurate information about the numbers of birds and BASH bird fatalities is available for use. All remaining projects under Goal 3 would have no potential to impact flight safety.

3.11.3.3 Cumulative Impacts

The Proposed Action would have beneficial impacts to safety and occupational health. No adverse impacts to safety resources would be expected to occur, and reduced fire fuel, continued wildland fire management, and continued BASH management would improve the ground and flight safety environment. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at Nellis AFB and the NTTR, beneficial cumulative impacts to safety would be anticipated to occur with implementation of the Proposed Action.

3.11.3.4 No Action Alternative

Under the No Action Alternative, management of natural resources would continue as characterized in the 2019 INRMP. The proposed projects described above would not be implemented, and the Air Force would not receive updated information on the effects of military activities on natural resources. Proactive measures would not be taken to control dangerous fuel buildup around the Installation and NTTR, potentially increasing the risk of wildland fire in these areas. Over time, the ability of Nellis AFB and the NTTR to develop an appropriate natural resources management framework would diminish, along with the Base's ability to support the military mission while facilitating effective natural resources management and minimizing the impacts of military operations on natural resources.

3.11.3.5 Best Management Practices and Mitigation Measures

No safety BMPs or mitigation measures are required as part of the Proposed Action.

CHAPTER 4 LIST OF PREPARERS

The following individuals assisted in the preparation of this Final EA.

Danielle Cemprola
Environmental Assessment Services, LLC
NEPA Program Manager
M.B.A., Business Administration
M.S., Community Development
B.S., Geography
Years of Experience: 15
Contribution: Program Management and Quality Control

Ronald Green, PhD
Environmental Assessment Services, LLC
Project Manager/Senior Scientist
Ph.D., Zoology
M.S., Wildlife Biology
B.S., Wildlife Biology
Years of Experience: 36
Contribution: Biology, Quality Control

Nick Sutton
Environmental Assessment Services, LLC
Project Manager and Planning Lead
B.S., Biology
Years of Experience: 7
Contribution: Quality Control

J. Michael Nied, PE
Environmental Assessment Services, LLC
Project Manager/Environmental Engineer
B.S., Biological Systems Engineering, Natural Resources and Environment
Years of Experience: 11
Contribution: Project Management, Air Quality, Biology, GIS

Elyse Maurer, CFM
Environmental Assessment Services, LLC
Project Manager
B.A., Geography
GIS Certificate
Years of Experience: 8
Contribution: Water Resources

Violet Perry, ACIP
Environmental Assessment Services, LLC
Environmental Planner
AICP Candidate
M.U.P., Urban Planning
B.S., Outdoor Adventure Leadership
Years of Experience: 1
Contribution: Cultural Resources, Earth Resources, Safety and Occupational Health, GIS

Joanne Stover
Environmental Assessment Services, LLC
B.S., Business Administration
Years of Experience: 28
Contribution: Technical Editor/Document Production

Karin Volpe
Environmental Assessment Services, LLC
Environmental Planner
B.A., Urban Planning
Minors: Disaster Risk Reduction
Years of Experience: 3
Contribution: Land Use, Infrastructure including Transportation and Utilities, GIS

4.1 GOVERNMENT CONTRIBUTORS

The following individuals contributed to this Final EA:

Contributor	Organization
Anna Johnson	99 CES/CEIEA, Natural Resources Program Manager
Olivia Curtis	99 CES/CEIEA, Natural Resources Program Manager
Nicky Daamen	ISS Environmental GIS Support Analyst, Environmental Management Directorate, AFCEC/CZO Nellis Air Force Base, NV
Catherine (Kate) Vaughn	ACC 99 CES/CEIEA, Cultural Resources Program Manager
Charles Rowland	99 CES/CENP, Chief, Portfolio Optimization

CHAPTER 5 REFERENCES

Air Force Civil Engineer Center 2017. *Nellis Air Force Base Air Installations Compatible Use Zones (AICUZ) Study*.

AFMAN, 2023. Defense Explosive Safety Regulation 6055.09_Air 36 Force Manual 91-201 (DESR6055.09_AFMAN) 91-201, *Explosives Safety Standards*,

Beatley, J.C. 1976. *Vascular plants of the Nevada Test Site and central-southern Nevada: Ecologic and geographic distributions*. Technical Information Center, Energy Research and Development Administration.

Bureau of Land Management. 2023. "BLM Nevada Weeds and Invasives Program". https://www.blm.gov/programs/weeds-and-invasives/blm-control-strategies/nevada (accessed 14 August 2023).

Cole. 1997. *Major Structural Controls on the Distribution of Pre-Tertiary Rocks, Nevada Test Site Vicinity, Southern Nevada*.

CSU, 2021. *U.S. Air Force Environmental GIS Data Floodplain Area Analysis – Nellis Air Force Base*. Colorado State University. December

EAS, 2023a. *Draft Final Environmental Assessment for Installation Development Nellis Air Force Base, Nevada.* Environmental Assessment Services, LLC. February

EAS, 2023b. *Final Description of the Proposed Action and Alternatives for Master Plan and Installation Development at Nellis Air Force Base, Nevada,* Environmental Assessment Services, LLC. September

Rutgers University. 2023. "Understanding Soil Compaction." Cooperative Extension of Ocean County. https://ocean.njaes.rutgers.edu/anr/understanding-soil-compaction/ (accessed 6 August 2023).

Dorner. 2002. *An introduction to using native plants in restoration projects*. Prepared for the Plant Conservation Alliance. https://www.fs.usda.gov/wildflowers/Native_Plant_Materials/documents/intronatplant.pdf (accessed 6 August 2023).

Drake, K.K., L. Bowen, K.E. Nussear, T.C. Esque, A. J. Berger, N.A. Custer, S.C. Waters, J.D. Johnson, A.K. Miles, and R.L. Lewison. 2016. "Negative impacts of invasive plants on conservation of sensitive desert wildlife." *Ecosphere* 7(10) e01531. https://esajournals.onlinelibrary.wiley.com/doi/10.1002/ecs2.1531 (accessed 6 August 2023).

Energy Information Administration. 2021. *Net Generation Nellis AFB Solar Array*. Energy Information Administration. http://www.eia.gov (accessed 6 August 2023).

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. Wetlands Research Program Technical Report Y-87-1. U.S. Army Corps of Engineers Waterways Experiment Station. January.

Federal Emergency Management Agency (FEMA). 2020. "Flood Zones." https://www.fema.gov/glossary/flood-zones (accessed 11 April 2023).

Las Vegas Valley Water District, 2021. *Where your water comes from*. https://www/lvvwd.com/water-system/where-your-water-comes-from/index.html. June

McIntyre, N.E., J. Rango, W.F. Fagan, and S.H. Faeth. 2001. "Ground arthropod community structure in a heterogeneous urban environment." *Landscape and Urban Planning.*

Nellis AFB. 2011. *Drinking Water Quality Report for Nellis Air Force Base*. US Air Force https://www.nellis.af.mil/ (accessed May 25, 2021).

Nellis AFB. 2017. *Final Integrated Cultural Resources Management Plan: Nellis Air Force Base/Creech Air Force Base/Nevada Test and Training Range*. US Air Force.

Nellis AFB. 2018a. *Installation Development Plan*. US Air Force. July.

Nellis AFB. 2018b. *Nellis Air Force Base Calendar Year 2017 Mobile Source Emissions Inventory*. United States Air Force. December 19.

Nellis AFB. 2019. *Final Integrated Natural Resources Management Plan*: Nellis Air Force Base/Creech Air Force Base/Nevada Test and Training Range. US Air Force.

Nellis AFB, 2019b. *Habitat Wetlands Report. Natural Resource Program Nellis Air Force Base, Creech Air Force Base, and the Nevada Test and Training Range*. June.

Nellis AFB. 2020a. *Estimate of Economic Impact: Nellis AFB, FY19.* U.S. Air Force. https://www.nellis.af.mil/Portals/104/Documents/Economic%20Impact%20Statement%20FY%202019%20Tri-Fold.pdf?ver=2020-04-08-165156-437 (accessed 7 June 2021).

Nellis AFB. 2020b. *Draft Nellis Nevada Test and Training Range Wildland Fire Management Plan*. US Air Force September.

Nellis AFB, 2020c. *Final U.S. Air Force Integrated Natural Resources Management Plan.* Nellis Air Force Base, Creech Air Force Base, and Nevada Test and Training Range. March 2019.

Nevada Test and Training Range. 2018. *Nevada Test and Training Range (NTTR) Land Withdrawal. Final Legislative Environmental Impact Statement*. October.

NOAA, 2023. Summary of Monthly Normals – North Las Vegas, NV US. National Oceanic Atmospheric Administration

Shelef, O., P.J. Weisberg, and F. D. Provenza. 2017. The Value of Native Plants and Local Production in an Era of Global Agriculture. *Frontiers in Plant Science* 8: 2069. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5723411/ (accessed 6 August 2023).

Spaulding, W.G. 1985. *Vegetation and Climates of the Last 45,000 Years in the Vicinity of the Nevada Test Site, South-Central Nevada*. US Geological Survey Professional Paper 1329. Denver, CO.

Stebbins, R.C. 2003. *A Field Guide to Western Reptiles and Amphibians*. Third Edition. Peterson Field Guide Series Boston: Houghton Mifflin Company.

Teixeira, L.H., F.A. Yannelli, G. Ganade, and J. Kollmann. 2020. "Functional Diversity and Invasive Species Influence Soil Fertility in Experimental Grasslands." *Plants*. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7020219/ (accessed 6 August 2023).

University of Nevada, Reno. 2023. "Basic Principles of Soil Health." University of Nevada Reno Extension, College of Agriculture, Biotechnology & Natural Resources. https://extension.unr.edu/publication.aspx?PubID=4877 (accessed 6 August 2023).

US Air Force. 2008. *Final Environmental Assessment for the Integrated Natural Resources Management Plan.* Nellis Air Force Base, Creech Air Force Base, and Nevada Test and Training Range, NV.

US Air Force. 2022a. *Final Report: 2021 Golden Eagle Report*. Prepared by Colorado State University Center for Environmental Management Military Lands. September.

US Air Force. 2022b. *Final Report: 2021 Migratory/Neo-Tropical Birds*. Prepared by Colorado State University Center for Environmental Management Military Lands. August.

US Army Corps of Engineers. 2020. Conversation with Mr. Kevin Roukey, Sacramento District, Nevada Office, regarding applicability of the ponds on the Sunrise Vista Golf Course as Waters of the United States under Section 404 of the Clean Water Act.

US Department of Agriculture. 2023. "Soil Health." https://www.farmers.gov/conservation/soil-health (accessed 6 August 2023).

US Environmental Protection Agency. 2020. *2017 National Emission Inventory Data – Facility Summaries, Nevada*. United States Environmental Protection Agency. https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data (accessed 21 August 2020).

USEPA, 2023. *Designation of Areas for Air Quality Planning Purposes – Section 197 Attainment Status Designations*. United States Environmental Protection Agency https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-81/subpart-C/section-81.329

US Fish and Wildlife Service (USFWS). 2017. *Air Force Pollinator Conservation Strategy and Reference Guide*. Prepared for the US Air Force Civil Engineer Center.

USFWS. 2018. *Programmatic Biological Opinion for Nevada Test and Training Range Proposed Project and Ongoing Operations*. Nellis Air Force Base, Nevada.

USFWS. 2023. *Programmatic Biological Opinion for Nellis Air Force Base and Small Arms Range Proposed Project and Ongoing Operations*. Nellis Air Force Base, Nevada. 12 September.

Working Lands for Wildlife. 2018. "Why is Cheatgrass Bad?" Ask An Expert: Mike Pellant, Rangeland Ecologist (retired), Bureau of Land Management. https://www.wlfw.org/why-is-cheatgrass-bad/ (accessed 6 August 2023).

This page intentionally left blank